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TECHNICAL REPORT SUMMARIES

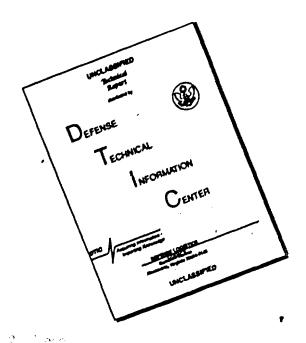# OCTOBER – DECEMBER 1986

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AFOSR

TECHNICAL REPORT SUMMARIES

FOURTH QUARTER 1986

INTRODUCTION

The Air Force Office of Scientific Research Technical Report Summaries are published quarterly as of March, June, September, and December of each calendar year. They consist of a brief summary of each AFOSR technical report received in the Technical Information Division and submitted to the Defense Technical Information Center (DTIC) for that quarter. The summaries contain two indexes for easily locating the technical reports that may be of interest to the user. These are followed by abstracts of the reports.

1) SUBJECT INDEX

   a. Subject Field
   b. Title of Report
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2) PERSONAL AUTHOR INDEX

   a. Primary Author
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PURPOSE

The purpose of this report is to inform Air Force Laboratories about the science that the Air Force Office of Scientific Research is supporting.

AFOSR MISSION

The Air Force Office of Scientific Research (AFOSR) is the Single Manager of the Air Force Defense Research Sciences Program (Program Element 61102F) and the primary Air Force agency for the extramural support of Fundamental scientific research. The AFOSR is organizationally under the DCS/Science and Technology, Air Force Systems Command.

AFOSR awards grants and contracts for research in areas of science relevant to the needs of the Air Force. Research is selected for support from unsolicited proposals originating from scientists investigating problems involving the search for new knowledge and the expansion of scientific principles. Selection is on the basis of scientific potential for improving Air Force operational capabilities, originality, significance to science, the qualification of the principal investigators, and the reasonableness of the proposed budget.

KEY TO READING THE DATA

The summaries consist of two indexes and the abstracts. From one of the two indexes, locate the AD number of the report that is of interest to you. Use this number to locate the abstract of the report in the abstracts section. The first report submitted to DTIC during the quarter (the one with the lowest AD number) appears on the last page of the abstracts section. The last report submitted to DTIC during the quarter (the one with the highest DTIC number) appears on the first page of the abstracts section. The following terms will give you a brief description of the elements used in each summary of this report.

DTIC Report Bibliography - DTIC's brief description of a technical report.

Search Control Number - A number assigned by DTIC at the time a bibliography is printed.

AD Number - A number assigned to each technical report when received by the DTIC.

Field & Group Numbers - (appearing after the AD number) First number is the subject field and the second number after the slash is the particular group under that subject field.

Corporate Author/Performing Organization - The organization; e.g., college/university, company, etc., at which the research is conducted.

Title - The title of the technical report.

Descriptive Note - Gives the type of report; e.g., final, interim, etc., and the period of the time of the research.

Date - Date of the technical report.

Pages - Total number of pages contained in the technical report.

Personal Author - Person or persons who wrote the report.

Contract/Grant Number - The instrument control number identifying the contracting activity and funding year under which the research is initiated.

Project Number - A number unique to a particular area of science; e.g., 2304 is the project number for mathematics.

Task Number - An alphanumeric number unique to a specific field of the main area of science; e.g., 2304 is the project number for mathematics and A3 is the task number for computational sciences.

Monitor Number - The number assigned to a particular report by the government agency monitoring the research. The number consists of the government monitor acronym, the present calendar year and the technical report assigned consecutively; e.g., AFOSR TR 83.0001 is the first number used for the first technical report processed for Calendar Year 1983.

Supplementary Note - A variety of statements pertaining to a report. For example, if the report is a journal article, the supplementary note might give you the journal citation, which will include the name of the journal the article it appears in, and the volume number, date, and the page numbers of the journal.

Abstract - A brief summary describing the research of the report.

Descriptors - Key words describing the research.

Identifiers - Commonly used designators, such as names of equipment, names of projects or acronyms, the AFOSR project and task number, and the Air Force Research Program Element number.

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO EVN548

AD B105 573L

AD B105 573L   CONTINUED

HARRIS CORP MELBOURNE FL GOVERNMENT ... SPACE SYSTEMS DIV

DESCRIPTORS   (U) *SPACECRAFT, *ATTITUDE CONTROL SYSTEMS, *VIBRATION ISOLATORS, *MATHEMATICAL ANALYSIS, CONTROL THEORY, SHAPE, ALIGNMENT, ENTROPY, STOCHASTIC PROCESSES, FINITE ELEMENT ANALYSIS, GAUSSIAN QUADRATURE, FLEXIBLE STRUCTURES, LYAPUNOV FUNCTIONS

IDENTIFIERS   (U) MEOP, Maximum Entropy Optimal Projection, PE61102F WUAFOSR2302B1

AD B105 573L   22 2

(U) MEOP Maximum Entropy Optimal Projection for Stochastic Modelling and Reduced Order Design of ...

DESCRIPTIVE NOTE:

AFR

PERSONAL AUTHORS: Mixed Order ... Greeley S

CONTRACT NO: F4962 ...

PROJECT NO:

TASK NO:

MONITOR:

DISTRIBUTION ... to U.S. Gov. ... US only Test ... Other requests must be referred to AFOSR Bldg 410 Washington DC 20332 6448

ABSTRACT   (U) ... deploying large ... on active ... spectral advances ... rd shape ... models and the ... d models present ... more extensively ... Programs ... Stochastic ... problems Inspired ... branch of dynamic modal ... ct vibration ... ntal generalization of ... d linear quadratic ... ve present scope ... d order modelling ... time discrete time

AD B105 573L

DEC 85

PERSONAL AUTHORS   Minetto M

REPORT NO   AFWAL-TR-85-4036-VOL-7-PT-2

CONTRACT NO   F33615-81-C-5038

PROJECT NO   1101

MONITOR   AFOSR
            TR-85-1106 VOL-7 PT-2

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45433. This document contains export controlled technical
data.

SUPPLEMENTARY NOTE   Prepared in cooperation with Control
Data Corp, Northeastern Univ, Texas A & M Univ, Boeing
Military Airplane Co, Structural Dynamics Research Corp.
See also Volume 7 Part 3 AD-B104 645L

ABSTRACT   U   This part of the ISDS Users Manual
describes how to install ISDS, how to add projects, users,
and databases to ISDS, and how to maintain ISDS. The
responsibility for installation and maintenance of ISDS
falls to a special role, the ISDS ADMINISTRATOR.
ISDSADMIN. Every installation of ISDS must have at
least one administrator; there may be as many as one
administrator for each project supported by the
installation, although that is not really necessary. In
addition to playing a special role with respect to ISDS,
the administrator needs to have administrator privileges
with respect to the ISDS database management system

AD-B104 966   CONTINUED

follow... and recommends basic activities and tools to use on a typical ICAM project. The framework and examples should provide the system developer with a sufficient understanding to be able to apply these techniques on other system development projects. The procedures and examples were developed using a Lisa workstation and will require some adaptation to other environments. The procedures describe much of the detail necessary to perform the activities on the ICAM project and also presents guidelines on how to adapt the SDP to other projects.

DESCRIPTORS: *B, *COMPUTER AIDED MANUFACTURING, SYSTEMS ENGINEERING, USER MANUALS, AEROSPACE INDUSTRY, METHODOLOGY, STANDARDIZATION, LIFE CYCLES

IDENTIFIERS: *, ICAM(Integrated Computer Aided Manufacturing), ISDS(Integrated System Development System), SDP System Development Process, EXPORT CONTROL, PE78011F, WUAFWALMTP10549

AD-B104 966   13 ?   9 2

HUGHES AIRCRAFT CO FULLERTON CA

Systems Engineering Methodologies for ICAM (Integrated Computer Aided Manufacturing). System Development Methodology User's Manual. Part 3 System Development Procedures.

DESCRIPTIVE NOTE: Final rept. 8 Sep ... 85

DEC 85   110P

PERSONAL AUTHORS: Propper, G., Crump, J., Oliver, E., Smith, ?

REPORT NO: OM-011000525-2-0

CONTRACT NO: F33615-81-C-5098

PROJECT NO: 1701 MTP1

TASK NO: 05

MONITOR: AFOSR, TR-85-4106-VOL-2-PT-3

UNCLASSIFIED REPORT
EXPORT CONTROL

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SUPPLEMENTARY NOTE: Prepared in cooperation with Control Data Corp., Northeastern Univ. ... M.Univ., Boeing Military Airplane Co. Structural ... Research Corp. See also Volume 4 Part 2. AD B104 ...

ABSTRACT: (U) This volume is intended to provide guidance to system developers on how to apply the techniques presented in the System Development Guidebook dated October 1983. That guidebook draws on existing knowledge of system development in general, as well as recent ICAM research. The guidebook presents an overview of the generalized system development process and the methodology that is incorporated ... should be applicable to most system development environments. This volume provides the guide that a developer needs ... a general framework to

AD B104 966

AD B104 966

DESCRIPTIVE NOTE   Final rept. 9 Sep 83-15 Apr 85

DEC 85   145P

PERSONAL AUTHORS   Ruoff, F

REPORT NO   UM020111D385-1-0

CONTRACT NO   F33615-81-C-5098

PROJECT NO   7701 MTP1

TASK NO   05

MONITOR   AFOSR
          TR 85 3109 VOL 2 PT 2

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45433 This document contains export controlled technical
data

SUPPLEMENTARY NOTE   Prepared in cooperation with Control
Data Corp Northeastern Univ Texas A & M Univ Boeing
Military Airplane Co Structural Dynamics Research Corp
See also Volume 2 Part 3 AD B104 966L

ABSTRACT   (U) This document presents the system
development methodology SDMD model and the life cycle
artifact LCA1 model These models are representations
of the system development process as reflected in the
system development methodology developed by the SEM
project The SDMD model provides a functional view of the
system development process using the IDEF0 modeling
technique The LCA1 model which is closely correlated to
the SDMD model uses the IDEF modeling technique to
present the information structure underlying the system
development process (Author)

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AD A173 577   CONTINUED

IDENTIFIERS   (U) WUAFOSR23681   PE61102F

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF MATERIALS
SCIENCE AND ENGINEERING

(U) Investigation of Device and Electronic Interactions
Associated with GaAs Device Processing

DESCRIPTIVE NOTE Annua rept 15 Jul 84 14 Aug 85

AUG 85   52P

PERSONAL AUTHORS Gatos Harry C

CONTRACT NO F49620 82 C 0130

PROJECT NO 2306

TASK NO D1

MONITOR AFOSR
         TR 85 1030

ABSTRACT   (U) Investigation is made ... direct and
electronic interactions in GaAs ... de along three
lines especially suited for ... de according ...
origin and control of ... with a wide band p level ...
feasibility for controlling vanadium doped semi insulating
GaAs and ... origin and control of ... dislocations
Employing DLTS measurements of ... in GaAs crystals
grown under different arsenic pressure ... in a new
deep level a dominant hole trap ... exhibits two charge
states ... (0,1,e) and 0 ... a deep band
These levels are most likely due ... arsenic and double
donor levels in the arsenic ant ... and Ga defect
The deep states are currently ... new level
photoluminescence in order to co ... level
luminescence spectra with trans ... istance spectra
Our study of vanadium doped GaAs ... led to
identification of the vanadium acceptor state V2+ 303
at 0 15 eV below the conduction band No midgap levels
other than E12 could be detected showing that vanadium
plays no direct role in the compensation process in SI
GaAs

DESCRIPTORS (U) GALLIUM ARSENIDES CRYSTAL EFFECTS
DEEP ALUMINUM DOPES SEMICONDUCTORS DISLOCATIONS,
ENERGY LEVELS GALLIUM

AD A173 577

... CONTINUED

DESCRIPTORS (U): FLAME HOLDERS. COMBUSTION STABILITY.
VORTEX SHEDDING. ACOUSTIC FIELDS. SHOCK WAVES. VARIABLE.
PRESSURE. LOW FREQUENCY. LABORATORY EQUIPMENT. COMBUSTORS.
BLUNT BODIES. COMBUSTION. AUGMENTATION. FLOW.
VISUALIZATION. ADDITION. BURNERS. FLAME HOLDERS.
ACOUSTICS. DIFFUSERS. ISOTHERMS. SHEAR PROPERTIES.
SPECTRAL ENERGY DISTRIBUTION. INLETS. LAYERS. LINEARITY.
NONLINEAR SYSTEMS. NUMERICAL ANALYSIS. OSCILLATION.
PRESSURE. PRODUCTION. RAMJET ENGINES. SPECTRAL LINES.
VISCOSITY. VORTICES.

IDENTIFIERS (U): Dump combustors. Shear layers. Self
excited oscillation. WUAFOSR2308A2. PE61102F

DESCRIPTIVE NOTE: Annual rept. 1 Oct 84-30 Sep 85

SEP 85

PERSONAL AUTHORS: Zukoski. E. E. Marble. F. E. Zukoski.
E. E.

CONTRACT NO: AFOSR 84-0286

PROJECT NO: 2308

TASK NO: A2

MONITOR: AFOSR
TR 86 1051

ABSTRACT (U): Analytical work devoted to the global
acoustics has been concerned with both linear and
nonlinear behavior. Good agreement has been found between
calculations of the mode shapes and data taken at the
Naval Weapons Center. Numerical calculations are in
progress to provide representation of the nonlinear
unsteady behavior of a normal shock wave in an inlet
diffuser, including viscous effects. Experimental
investigations of combustion have been carried out with
pressure spectral line intensity and flow visualization
techniques in a burner equipped with a bluff body
flameholder. When the combustion is stable, the ... in
the flameholder shear layers has many or the
characteristics of isothermal shear layers. When unstable
combustion occurs, the shear layers are characterized by
large vortices which are shed from the flame holder lip.
The self excited oscillations appear to result from a
coupling between the vortex production mechanism and
acoustic behavior in combustion in the vortex. Both steady and
nonsteady processes are being studied. Calculations of
the combustion augmentation associated with the
interaction of a burning vortex with a wall show a well-
defined combustion rise but somewhat less marked than was
expected on the basis of experimental observations.

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AD A173 572   CONTINUED

AD A173 572   20 6   11 2

AEROMETRICS INC MOUNTAIN VIEW CA

..elocity in turbulent spray flames with swirl and
recirculation.

II Spray Characterization Using Phase Angle Detection

DESCRIPTORS   U: MIE SCATTERING, PARTICLE SIZE, LIGHT
SCATTERING, FLAMES, MEASUREMENT, DOPPLER EFFECT, PHASE
SHIFT FREQUENCY SHIFT, COMPLEX VARIABLES, REFLECTION,
SPRAYS GAUSSIAN QUADRATURE, BACKSCATTERING, REFRACTIVE
INDEX QUANTUM EFFICIENCY SHOT NOISE, TURBULENCE
COMBUSTION STABILITY

DESCRIPTIVE NOTE Final rept.

JUL 86   15P

PERSONAL AUTHORS   Bachalo William D

IDENTIFIERS   :U: WUAFOSR2308A3 PE61102F

CONTRACT NO   F49620-81-C-0029

PROJECT NO   2308

TASK NO

MONITOR   AFOSR 0029

UNCLASSIFIED REPORT

ABSTRACT   : An innovative method for measuring the
particle size and velocity simultaneously using the
Doppler difference frequency, and the phase shift of the
scattered light is derived, analyzed, and evaluated
experimentally. In this, the theoretical analysis of
the dual beam laser light scattering phenomena were
performed using a simple geometrical optics theory. This
approach leads ready insight of the complex scattering
phenomena associated with the path of light particular the
difficulties that may occur when scattering amplitudes
due to reflection and refraction are of similar order of
magnitude were easily investigated. Numerous experiments
using monodispersed drop streams were used to assess the
measurement accuracy and possible errors produced by the
mixed scattering components. The Lorenz Mie theory was
derived for the dual beam scattering and used to evaluate
the measurement capability for particles on the order of
a micron in diameter. Experiments were conducted using
polystyrene latex spheres to demonstrate that particles as
small as 0.5 micron can be measured. Comparisons with
sampling probe data, nozzle flowrate, and light
extinction measurements were in good agreement.
Incorporation of frequency shifting into the system
allowed the measurement of the drop angle of trajectory
and reversed flow velocity components while eliminating
directional ambiguity. Experiments are reported comparing
the size and velocity distributions for dispersed flows
generated by two different spray nozzles of drop size and
....

UNCLASSIFIED REPORT

ABSTRACT (U) Investigations of both the microscopic and macroscopic properties of thin film superconducting material are being carried out. Compounds under study are either technologically significant or involve possible unique mechanisms for superconductivity or the realization may extend the range of critical parameters. Under study are low carrier density superconductors, selected heavy fermion compounds and Chevrel phase superconductors. High quality superconducting films of both PbTe Tl and mixtures of La2S4-La3S4 have been prepared. These materials are low carrier density superconductors. This work is an important step in the direction of fabricating three terminal superconducting devices. Films of NbTi have been produced which exhibit superconductivity. The goal of demonstrating the nature of superconducting pairing in this heavy fermion compound using tunneling and the proximity effect is in sight. Domain wall superconductivity has been demonstrated in the ferromagnetic phase of HoMo6S8, a Chevrel phase compound which is a reentrant superconductor.

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO EVN54B

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LANTHANUM INTERMETALLICS, SULFUR COMPOUNDS, ELECTRON   VIRGINIA UNIV CHARLOTTESVILLE DEPT OF MATERIALS SCIENCE
DENSITY FIELD EFFECT TRANSISTORS, FERROMAGNETIC
MATERIALS
                                                        (U) Physical Techniques for the Study of Sorption,
IDENTIFIERS   U   PE61102F, WUAFOSR2305C1   Diffusion, Electrical Properties, and Interfacial
                                                            Effects in Ordered Polymers, Charge Transport and
                                                            Conduction Mechanisms in Polymer Fibers

                                                        DESCRIPTIVE NOTE: Final rept. 9 Sep 84-8 Sep 85.

                                                        JUL 86   292P

                                                        PERSONAL AUTHORS: Barker, R E , Jr ;Hawk, J A

                                                        REPORT NO   UVA/525646/MS87/101

                                                        CONTRACT NO   AFOSR-82-0290

                                                        PROJECT NO   2303

                                                        TASK NO   A3

                                                        MONITOR   AFOSR
                                                                  TR-86 0831

                                                        UNCLASSIFIED REPORT

ABSTRACT: (U) Electrical conduction in several types of
polymer fibers has been investigated under a variety of
environmental conditions. The configuration and
circumstances of these experiments are quite different
from the ordinary types of measurements reported in the
literature dealing with the conductivity of thin films.
Methods for separating the surface component of the total
conductivity from the volume component are developed and
experiments are performed on both doped and undoped
samples. Experimental results indicate that the surface
is the major region of current flow for some fibers In
this work special techniques and instrumentation
previously utilized by Chen and Barker have been further
developed to measure electrical conductivities of small
diameter polymer fibers as small as 10 micrometers The
fibers studied included the Air Force ordered polymers
PPBT (polyparaphenylene benzobisthiazole) and BBL
(benzimidazo benzophenanthroli For comparison nylon6,
nylon6 6, polypropylene, and polyethylene also were
included in the study. Several types of dopants were used
in this research; these included metal-salts solutions (e
g , LiCl, NaCl, etc), organic liquids (e g , n pentane,

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AD-A173 490   CONTINUED

phenol, etc. and charge transfer complex forming
dopants.e.g. I2. The effect on fibers of this doping
produced variations in the electrical conductivity which
sometimes were surprising.

DESCRIPTORS: (U) *POLYMERS, *FIBERS, *CHARGE TRANSFER,
*ELECTRICAL CONDUCTIVITY, SURFACES, SORPTION, DIFFUSION,
INTERFACIAL TENSION, POLYPHENYLENES, BENZENE, THIAZOLES,
NYLON, POLYPROPYLENE, POLYETHYLENE, DOPING

IDENTIFIERS: (U) PPBT;Polyparaphenylene Benzobisthiazole;
BBL;Benzimidazo Benzophenanthroline; WUAFOSR2303A3;
PE61102F

AD-A173 466   7/3

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) Synthon for the Silicon-Silicon Triple Bond.

86   3P

PERSONAL AUTHORS: Sekiguchi,Akira ;Zigler,Steven S. ;West,
Robert

CONTRACT NO   F49620-83-C-0044, F49620-84-C-0065

PROJECT NO   2303

TASK I.C.   B2

MONITOR: AFOSR
TR-86-0980

UNCLASSIFIED REPORT

ABSTRACT: (U)   The disilole, di-o-methyl-2,3,4,5-
tetraphenyl-1-silacyclopentadien-1-yl) 1. reacts with
benzyne to yield di(2,3-benzo-7-methyl-7-silanorbornadien-
7-yl) 2. When heated with anthracene to 250 C. 2
transfers the CH3SiSiCH3 fragment giving 2,3,5,6,10,11,13,
14-tetrabenzo-7,8-dimethyl-7,8-disilatetracyclo 2.2.2.2.0.
tetradeca 2,5,10,13-tetraene 4. the formal 9,10-adduct of
dimethyldisilyne with two molecules of anthracene. The
spectral properties and crystal structure of 4 are
reported. and possible mechanisms for its formation are
discussed.

DESCRIPTORS: (U) *SILICON COMPOUNDS, *ORGANIC COMPOUNDS,
*CHEMICAL BONDS, SPECTRA, ANTHRACENES, MOLECULES, METHYL
RADICALS, BENZENE, CHEMICAL REACTIONS, CRYSTAL STRUCTURE,
REPRINTS

IDENTIFIERS   (U)   PE61102F, WUAFOSR2303B2

AD-A173 490

DTIC REPORT BIBLIOGRAPHY

AD-A173 463   20 6

ENVIRONMENTAL RESEARCH INST OF MICHIGAN ANN ARBOR

(U) Phase Retrieval Using Boundary Conditions.

FEB 86   6P

PERSONAL AUTHORS: Fienup,James R.

CONTRACT NO: F49620-82-K-0018

PROJECT NO: 2311

TASK NO: A

MONITOR: AFOSR
           TR-86-0947

ABSTRACT: (U)   It is shown that a priori knowledge of the
edges of an object is not sufficient to ensure that it
can be uniquely reconstructed from the modulus of its
Fourier transform or from its autocorrelation function).
Furthermore even in those cases for which the ultimate
solution is unique, in intermediate steps in the solution
by the recursive Hayes-Quatieri algorithm there can be
ambiguities. An extension of the recursive algorithm that
finds the solution (or solutions) is suggested and it is
shown that the recursive method can be applied to complex-
valued objects.

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DTIC REPORT BIBLIOGRAPHY

AD-A173 465   7 3

WISCONSIN UNIV MADISON DEPT OF CHEMISTRY

(U) Structural and Chemical Properties of 1,3-
Cyclodisiloxanes.

86   9P

PERSONAL AUTHORS: Michalczyk,Michael J.   Fink,Mark J.
Haller,Kenneth J.   West,Robert Michl,Josef

CONTRACT NO: F49620 83 C-0044

PROJECT NO: 2303

TASK NO: B2

MONITOR: AFOSR
           TR 86 0991

ABSTRACT: (U)   The synthesis and x-ray crystal structures
for tetramesitylcyclodisiloxane 4 trans- 1,3-dimesityl
1,3 tert butylcyclodisiloxane 5a and cis-1,3-
disBIS TRIMETHYLSILYL AMINO 1,3 dimesitylcyclodisiloxane.
6b are reported Crystals of 4 are tetragonal of space
group ll sub l 1 s crystals of 5a and 6b are triclinic of
space group P1 Both 4 and 6b have slightly puckered four
membered rings while the ring in 5a is planar. The
silicon silicon nonbonded distances in 4 5a and 6b are
230.6 239.6 and 234.9 pm respectively close to the
values usual for normal silicon-silicon single bonds (234
235 pm). These short distances are believed to arise from
ring distortions due to an antibonding interaction
between the oxygen atoms Some representative chemical
reactions of 4 5a and 6b are also presented

AD A173 465

AD-A173 459   20/8   20/10

STATE UNIV OF NEW YORK AT BUFFALO AMHERST

(U) Wigner Phase-Space Description above and Below the
    Classical Threshold for the H + H2 Reaction.

    JUN 86   4P

PERSONAL AUTHORS: Lee.Hai-Woong ;George.Thomas F. ;

CONTRACT NO. F49620-86-C-6448, F49620-86-C-0009

PROJECT NO. 2303

TASK NO. A2

MONITOR: AFOSR
          TR-86-0975

          UNCLASSIFIED REPORT

ABSTRACT: (U) The Wigner phase space representation
offers a semiclassical way of describing molecular
collisions. In this paper the collinear H + H2 exchange
reaction is studied using the Wigner phase space approach.
The general behavior of the calculated Wigner reaction
probabilities as a function of the collision energy is
consistent with that of the exact quantum-mechanical
probabilities reported in the past. Quantitative
disagreements between the Wigner and quantum-mechanical
probabilities arise mainly from the neglect of dynamical
tunneling in the Wigner approach due to the use of real
valued classical trajectories. Nevertheless, the Wigner
approach is capable of describing some aspect of
tunneling as the high momentum tail of the initial Wigner
distribution function is likely to exhibit tunneling.
Thus the approach yields a nonzero reaction probability
below the classical threshold energy.

DESCRIPTORS: (U) *QUANTUM THEORY, *PARTICLE COLLISIONS,
*HYDROGEN, YIELD, DYNAMICS, COLLISIONS, MOLECULES, ENERGY,
THRESHOLD EFFECTS, MOMENTUM PROBABILITY, REPRINTS,
TUNNELING(ELECTRONICS), EXCHANGE REACTIONS

IDENTIFIERS: (U) Wigner Distribution function, PE61102F,
WUAFOSR2303A2

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          UNCLASSIFIED   PAGE   12   EVN548

AD-A173 460   12/1

NORTH CAROLINA STATE UNIV AT RALEIGH DEPT OF MATHEMATICS

(U) Consistent Initial Conditions for Linear Time Varying
    Singular Systems.

    86   7p

PERSONAL AUTHORS: Campbell.Stephen L. ;

CONTRACT NO. AFOSR-84-0240

PROJECT NO. 2304

TASK NO. A1

MONITOR: AFOSR
          TR-86-1038

          UNCLASSIFIED REPORT

ABSTRACT: (U) A fairly direct method   given for
calculating the consistent initial   ...ions for a wide
class of implicit linear time vary . s items A(t)x'(t) +
B(t)x(t) = f(t) with A(t) singular.

DESCRIPTORS: (U) *LINEAR SYSTEMS, *NUMERICAL METHODS AND
PROCEDURES, COMPUTATIONS, DIFFERENTIAL EQUATIONS,
REPRINTS.

IDENTIFIERS: (U) Time Varying Singular Systems. PE61102F,
WUAFOSR2304A1

AD-A173 460

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A173 456   12/1

NORTHWESTERN UNIV EVANSTON IL DEPT OF MECHANICAL AND
NUCLEAR ENGINEERING

(U) A Controller for Robust Asymptotic Tracking in Systems
    with Time Varying Uncertainties.

JUN 86   5P

PERSONAL AUTHORS: Hopp T H ;Schmitendorf W E .

CONTRACT NO.   AFOSR 85-0051

PROJECT NO. 2304

TASK NO.   A3

MONITOR   AFOSR
           TR 86 1037

SUPPLEMENTARY NOTE: Pub. in AIAA Guidance and Control
Conference. p691 694 Jun 86

ABSTRACT   (U)   This reprint considers a class of linear
systems in which there is time-varying uncertainty and
additive disturbances. A control law is determined which
produces practical tracking. Practical tracking
guarantees that the asymptotic tracking error can be made
arbitrarily small. Existing theory provides asymptotic
tracking only for systems where the uncertainty is
uniform but constant. The theory presented here is able
to accommodate the more realistic situation of time
varying uncertainty.

DESCRIPTORS (U)   *LINEAR SYSTEMS *CONTROL SYSTEMS,
CONTROL THEORY GUARANTEES, REPRINTS, TRACKING,
ASYMPTOTIC NORMALITY

IDENTIFIERS (U)   WUAFOSR2304A3   PE61102F

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AD-A173 412   11/6   20/11   14/2

SRI INTERNATIONAL MENLO PARK CA

(U) Dynamic Fracture Behavior of Structural Materials.

DESCRIPTIVE NOTE: Final rept. Feb 81-Jan 86.

JUL 86   224P

PERSONAL AUTHORS: Giovanola,J. H. ;Shockey,D. A ;

CONTRACT NO.   F49620-81-K-0007

PROJECT NO.   2306

TASK NO.   A1

MONITOR   AFOSR
           TR-86-0818

ABSTRACT: (U)   This report presents results of a program
to improve understanding of dynamic fracture behavior by
investigating both crack tip loading conditions and
material properties for fracture at high loading rates. A
new test procedure the one point bend test was analyzed
and further developed th test a wide range of materials
at impact loading rates. The test uses inertial loading
to load the crack tip and affords an unambiguous
measurement of the dynamic initiation toughness. The
test's usefulness in producing small controlled
increments of crack extension and in crack propagation
studies was also demonstrated. Moreover the concept of
inertial loading was extended to study dynamic mixed mode
crack initiation under controlled mixed mode I and II
conditions. These new test techniques were used to
establish the dynamic fracture behavior of 4340 steel
(HRC 50). It was shown that for loading times to
fracture as short as 20 microsecs. no time modified
criterion is necessary to predict crack initiation. The
classical fracture criterion equating the applied stress
intensity to the dynamic fracture toughness is adequate,
provided the dynamically applied stress intensity is
correctly evaluated. Under mixed mode I and II loading
with (K sub II)/(K sub I) values between 0 and 0.5 it
was demonstrated that dynamic crack initiation is
essentially controlled by the mode I stress intensity and
by the mode I dynamic fracture toughness.

AD-A173 412

SEARCH CONTROL NO. EVN54B

AD-A173 411   17/9   20/6   20/1   9/3

CALIFORNIA INST OF TECH PASADENA DEPT OF ELECTRICAL
ENGINEERING

(U) Acousto-Optic Processing of 2-D Signals Using Temporal
and Spatial Integration

DESCRIPTIVE NOTE: Final rept.

APR 86   170P

PERSONAL AUTHORS: Psaltis,Demetri.

CONTRACT NO.   AFOSR-82-0128

PROJECT NO.   2305

TASK NO.   B1

MONITOR: AFOSR
                TR-86-0847

UNCLASSIFIED REPORT

ABSTRACT: (U)   The report describes research to develop
acoustooptic information processing systems capable of
processing two dimensional signals. The general
methodology that was developed for accomplishing this, is
the use of a combination of temporal and spatial
integrations in the optical system. Acoustooptic
processors for synthetic aperture radar image formation
were designed and experimentally demonstrated. The radar
imaging processor is capable of forming images in real
time with relatively low size and power requirements.
Several processors were also developed for pattern
recognition applications and an acoustooptic system
capable of producing two dimensional correlations of
images at standard video rates was experimentally
demonstrated. The same signal processing method was
applied to two dimensional spectrum analysis and the
processing of signals from broadband adaptive phased
arrays. In both instance acoustooptic architectures were
developed and initial experimental demonstrations were
performed.

DESCRIPTORS: (U)   *OPTICAL PROCESSING, *RADAR IMAGES,
*ACOUSTOOPTICS, INFORMATION PROCESSING, PATTERN
RECOGNITION, ADAPTIVE SYSTEMS, PHASED ARRAYS, TWO
DIMENSIONAL, SYNTHETIC APERTURE RADAR, PATTERN

AD-A173 411

PAGE   14   EVN54B

AD-A173 412   CONTINUED

DESCRIPTORS: (U)   *CRACKING/FRACTURING,
*FRACTURE/MECHANICS, *STRUCTURAL STEEL, CONSTRUCTION
MATERIALS, CRACK PROPAGATION, CRACKS, DYNAMICS, HIGH RATE,
IMPACT, INERTIAL SYSTEMS, LOADS(FORCES), RANGE(EXTREMES),
STRESS CONCENTRATION, TEST METHODS, TOUGHNESS, DYNAMIC
LOADS, DYNAMIC RESPONSE, DYNAMIC TESTS, IMPULSE LOADING

IDENTIFIERS: (U)   Cracking Tip Loading, One Point Bend
Tests, Crack Initiation, Steel 4340, Fracture Toughness,
LPN-SRI-PYU 2777 WUAFOSR2306A1, PE61102F

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD A173 411   CONTINUED

AD-A173 370   20/12

RECOGNITION. SPECTRUM ANALYSIS. DYNAMIC RANGE. BIAS   HUGHES RESEARCH LABS   MALIBU CA

IDENTIFIERS   (U) WUAFOSR2305B1   PEG:102E

(U) Nonlinear Optical Properties and Subpicosecond
Dynamics of Excitons and Electron-Hole Plasmas in
Multiple Quantum Well Structures.

DESCRIPTIVE NOTE: Annual rept. Jul 84-Jul 86.

AUG 86   142P

PERSONAL AUTHORS: Smirl,A. L. ;McFarlane,R. A. ;Lam,J. F.
;

CONTRACT NO.   F49620-84-C-0083

PROJECT NO.   2305

TASK NO.   B4

MONITOR: AFOSR
TR-86-0837

ABSTRACT   (U)   Progress is reported in measuring the
nonlinear optical properties and picosecond dynamics of
carriers in multiple quantum wells and other bulk and
Molecular Beam Epitaxially grown structures. Discussions
of our progress are divided into six parts: 1
fabrication and characterization, (2) picosecond time-
resolved transient absorption, (3) picosecond time-
resolved photoluminescence, (4) theory of dressed
excitons, (5) picosecond photorefractive effects, and (6
picosecond and femtosecond laser development. Keywords.
Nonlinear Optics; Optical Devices; Ultrafast Phenomena;
Multiple Quantum Wells.

DESCRIPTORS   (U) :SOLID STATE PHYSICS. :QUANTUM THEORY.
EPITAXIAL GROWTH. MOLECULAR BEAMS. BULK MATERIALS.
DYNAMICS. ELECTRONS. HIGH RATE. HOLES(ELECTRON
DEFICIENCIES). LASERS. MOLECULAR BEAMS. NONLINEAR SYSTEMS.
OPTICAL EQUIPMENT. OPTICAL PROPERTIES. OPTICS.
PHOTOLUMINESCENCE. PLASMAS(PHYSICS). STRUCTURES.
HETEROJUNCTIONS. GALLIUM ARSENIDES. ALUMINUM GALLIUM
ARSENIDE

IDENTIFIERS   (U) :Quantum Wells. Photoreflectance.
PE61102F. WUAFOSR2305B4

AD-A173 370

AD-A173 411

AD-A173 356   11 6   20 11

STANFORD UNIV CA DEPT OF MATERIALS SCIENCE AND
ENGINEERING

(U) An Investigation of the Structure and High Temperature
    Mechanical Properties of Oxide Dispersion Strengthened
    Alloys

DESCRIPTIVE NOTE   Final rept. 1 Oct 80-30 Sep 85.

SEP 86   32P

PERSONAL AUTHORS   Nix William D

CONTRACT NO   AFOSR-81-0022

PROJECT NO   2306

TASK NO   A1

MONITOR   AFOSR
           TR 86 1002

UNCLASSIFIED REPORT

ABSTRACT   (U)   The research work deals with the structure
and mechanical properties of high temperature metals and
alloys in which a significant contribution to
strengthening is made by dispersed second phase particles.
Because the research has been conducted on both aluminum
and nickel based alloys, this report is organized along
these lines. We have studied, for the first time, the
combined effects of oxide dispersion and solute
strengthening at high temperatures in an ODS aluminum-
magnesium alloy. We find that the oxide particles
contribute significantly to the strength at high
temperatures, as expected, but that the strength of the
ODS alloy at intermediate temperatures is actually lower
than that for the solid solution without oxide particles.
This suggests that solute strengthening cannot be
combined efficiently with oxide strengthening in the
design of ODS alloys. Because rapidly solidified aluminum
alloys are so similar to ODS aluminum alloys, a study of
the high temperature strength properties of Al-Fe-Ce
alloys has also been conducted. We find these
alloys to be much stronger than ODS aluminum at low and
intermediate temperature but they are much weaker than
the ODS alloys at very high temperatures. This weakening
effect is caused mainly by twinning deformation of the

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AD-A173 356   CONTINUED

intermetallic particles at high temperatures. This
suggests that much more refractory particles, such as
oxides or carbides, are needed for high temperature
strength

DESCRIPTORS   (U)   *NICKEL ALLOYS, *OXIDES, *ALUMINUM
ALLOYS, *HIGH STRENGTH ALLOYS, ALLO/S, ALUMINUM, CARBIDES,
CERIUM ALLOYS, DEFORMATION, DISPERSING, DISPERSION
HARDENING, HIGH STRENGTH, HIGH TEMPERATURE, INTERMETALLIC
COMPOUNDS, IRON ALLOYS, MECHANICAL PROPERTIES, METALS,
PARTICLES, SOLID SOLUTIONS, SOLIDIFICATION, SOLUTES,
STRENGTH(GENERAL), STRENGTH(MECHANICS), TEMPERATURE,
TWINNING(CRYSTALLOGRAPHY), OXIDATION RESISTANCE

IDENTIFIERS   (U)   ODS(Oxide Dispersion Strengthened),
PE61102F, WUAFOSR2306A1

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVN548

AD-A173 352   7/3

NORTH TEXAS STATE UNIV   DENTON DEPT OF CHEMISTRY

(U) Synthesis of the Two Epimeric 6 Carbomethoxy- 5.
Dimethyl-endo-tricyclo 5 2 1 0 2,6 dec 8-en-3 Ones
Unequivocal Structural Assignment of the 5 Alpha- and
5Beta Isomers via Two Dimensional NMR Spectroscopy

86   4P

PERSONAL AUTHORS   Smith, William B   Marchand, Alan P
Suri, Suresh C   Jin Pei Wen

CONTRACT NO   AFOSR 84-0065

PROJECT NO   2 13

TASK NO   B2

MONITOR   AFOSR
           TR-86-0972

ABSTRACT   (U)   Alkylation of 1-methyl exo 6
carbomethoxy-tricyclo 5 2 1 0 2,6 dec 8 dien 3 one with
Me2CuLi affords a mixture of potentially 8 carbomethoxy-1,5-
dimethyl endo tricyclo 5 2 1 0 2,6 dec 8 en ones 1 and 2
the econ configurations 1 and 2 were assigned via a
combination of 2D NMR and 1D NOE studies. In addition,
the reduction of the corresponding keto acetylation on a
bicyclic ring and 2 corresponding ketons were formed
the solution, and the acidic acetate based on a double endo
configuration to 1 ... enb 3

AD-A173 352

AD-A173 351   7/3

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES LOKER
HYDROCARBON RESEARCH INST

(U) Preparation of Oligomeric and Polymeric Alpha,Omega-
Bis(trimethylsilyloxy)polymethylchlorosiloxanes and
Their Reactions with Alkyllithium Reagents.

86   9P

PERSONAL AUTHORS   Pai, Yi-Ming   Servis,Kenneth L   Weber,
William P

CONTRACT NO   AFOSR 82-0003

PROJECT NO   2304

TASK NO   A6

MONITOR   AFOSR
           TR-86-1066

ABSTRACT   (U)   A series of alpha, omega-
bis(trimethylsilyloxy)polymethylchlorosiloxanes MD
superscript CL sub nM, n=1-5 and approx 35, as well as MD
superscript Cl D superscript nM have been prepared by the
palladium or carbon catalyzed exchange reaction of MD
superscript H sub nM with a silyl or benzyl chloride. The
reaction of these with alkyl lithium reagents in ether at
-78C has been studied. Alkylation without cleavage of the
siloxane backbone is observed with the oligomeric MD
superscript CL sub nM. On the other hand MD superscript
nM and MD superscript CL D superscript nM undergo facile
siloxane cleavage. Some cleavage is also observed with
the polymer MD superscript CL approx 35M. The spectral
properties in particular 1H, 13C, and 29Si NMR of both
(U) superscript H sub nM and MD superscript CL nM are
reported. The interpretation of the 13C and 29Si NMR
spectra of siloxane oligomers which are chiral at both Si
and C is discussed

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SEARCH CONTROL NO EVN54B

AD-A173 349 ? 4 11 9 20 12

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Structure of the Iodine Columns in Iodinated Nylon 6.

86 10P

PERSONAL AUTHORS: Burzynski,Ryszard ,Prasad,Paras N ;
Murthy,N S .

REPORT NO SUNY-AB/TR-6

CONTRACT NO F49620-85-C-0052

PROJECT NO 2303

TASK NO B3

MONITOR AFOSR
TR-86-0953

UNCLASSIFIED REPORT

ABSTRACT (U) Halogenated materials such as polyiodide
or polybromide complex and halogen-doped polymers have
been extensively investigated in recent years 1 5 The
interest in these systems stems from the tremendous
increase in the electrical conductivity upon halogen
doping Many of these intercalated polyhalide materials
behave as low-dimensional conductors Much of the
research effort has been devoted to the study of the
nature of these halogen species and to determine if
charge transfer between the dopant and the donor or a
partial oxidation of the original material leads to an
increase in the conductivity A study of iodine-complexed
nylon 6 films by polarized resonance Raman spectra shows
the presence of both I3-- and I5-- species the latter
most likely in the form of I2 I3--- complex polarization
characteristics of the Raman spectra show that the I2 I3
units are oriented along the polymer chain and the I3---
ions are perpendicular to the chain axis The I2 I3---
units are in a more stable moiety than the I3-- species
These Raman results are consistent with the x ray
diffraction data

DESCRIPTORS: (U) NYLON IODINE MOLECULAR STRUCTURE

AD-A173 349

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AD A171 329   (CONTINUED)

(POLYMERIC FILMS, ELECTRIC ...
SPECTROSCOPY, OPTICAL ... ORIENTATION, ...STABILITY,
DOPING, CURING TOLUENE, OXIDATION, DIFFRACTION,
REORIENTS, X-RAY DIFFRACTION

IDENTIFIERS   ...AB OSE3 ...P D ...

SEARCH CONTROL NO EVNS2B

AD A171 638   G 1   20 5   20 7   20 3

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF
ELECTRONICS

U The Rippled Field Magnetron Cross Field Free Electron
Laser

DEC 85   8F

PERSONAL AUTHORS   Hartemann F ; Bekefi G ; Shefer R E

CONTRACT NO   N00014-84-0026

PROJECT NO   2301

TASK NO   A1

MONITOR   AFOSR
TR 86 (045)

UNCLASSIFIED REPORT

ABSTRACT   U Millimeter wave emission from the rippled
field magnetron cross field free electron laser FEL
is investigated experimentally and theoretically. In this
device electrons move in quasi-circular orbits under the
combined action of a radial electrostatic field, a uniform
axial magnetic field, and an azimuthal electric field
which produces a magnetic field. ...

DESCRIPTORS   MAGNETRONS, ELECTRICAL LASERS,
CROSS FIELD MAGNETRONS, MAGNETIC FIELDS, ELECTRON
BEAMS, ... RESONANCE, MAGNETIC FIELD
BEAMS, ...

IDENTIFIERS   ... Rippled Field ...
Magnetron, Free Electron Magnetron, CFEL, Crossed Field
Free Electron Laser, ... Magnetic Particles

AD A171 638

AD-A173 345

AD-A173 345   7 2   20 Jul

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

U Aspects of Organomercury Chemistry.

85   8P

PERSONAL AUTHORS: Dewar,Michael S. ;Merz,Kenneth M. , Jr.

CONTRACT NO   F49620-83-C-0024

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
TR-86-1045

UNCLASSIFIED REPORT

ABSTRACT: (U)   Mercury has long been an element of
especial interest to both inorganic and organic chemists,
partly because of its varied chemistry and partly because
its compounds are readily available. Since MNDO has now
been parameterized for mercury, we decided to study two
topics of interest in the organomercury area, partly in
the hope of resolving uncertainties and partly to check
the ability of MNDO to deal with an element from the
sixth row. The topics studied were a) sandwich and half-
sandwich(cyclopentadienyl) mercury compounds and b) the
addition of mercury cations to olefins(oxymercuration).

DESCRIPTORS: (U)   *ORGANOMETALLIC COMPOUNDS; *MERCURY;
QUANTUM THEORY; MOLECULAR STRUCTURE; CYCLIC COMPOUNDS;
ADDITION REACTIONS; CATIONS; OLEFIN POLYMERS; HEAT OF
FORMATION; REPRINTS

IDENTIFIERS: (U)   MNDO(Modified Neglect of Differential
Overlap); WUAFOSR230302 PEG1102F

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A173 324   20 6   9 2

AD-A173 324   CONTINUED

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES SIGNAL AND
IMAGE PROCESSING INST

INTERCONNECTIONS, CIRCUITS, DEMONSTRATIONS, DIAGRAMS,
DIGITAL SYSTEMS, GATES(CIRCUITS), HIGH VELOCITY, HYBRID
SYSTEMS, MAPPING, OPTIMIZATION, POSITION(LOCATION)

(U) Nonlinear Real-Time Optical Signal Processing

IDENTIFIERS: (U) WUAFOSR2305B1, PE61102F

DESCRIPTIVE NOTE: Annual rept. 1 Jul 84-30 Jun 85

JUL 86   27P

PERSONAL AUTHORS: Sawchuk, A. A.   Jenkins, B. K.

CONTRACT NO: AFOSR 84-0181

PROJECT NO: 2305

TASK NO: B1

MONITOR: AFOSR
             TR 86-0834

UNCLASSIFIED REPORT

ABSTRACT: (U)   During the period 1 July 1984 - 30 June
1985, the research under grant AFOSR-84-0181 has
concentrated on four major areas. First, work has
continued on an experimental sequential optical binary
parallel architecture that is constructed from an array
of binary optical switching elements - NOR gates with
interconnections done by a computer generated hologram.
We are rewriting new binary arrays with a high efficiency,
high space-bandwidth product SBW interconnection
hologram, and compact reflection optics of the general
architecture with the intent of building a larger
demonstration system with greater capabilities. Next we
have studied improved methods of studying the
interconnections in these systems by the use of hybrid
digital binary finite holograms we have examined
analytical techniques for mapping circuit diagrams into
gate locations, and holographic array, and optimization
procedures to determine the minimum set of necessary
space invariant basis functions. Another area of study has
been the construction of devices and materials for high
speed optical switching and bistability.

DESCRIPTORS: OPTICAL EQUIPMENT, COMPONENTS, OPTICAL
                 SWITCHES, GATES, HOLOGRAMS, NOR GATES,
                 ANALYTICAL ARCHITECTURE, CIRCUIT

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ELECTROMAGNETIC LAUNCH RESEARCH INC CAMBRIDGE MA

(U) Metallic Induction Reaction Engine

DESCRIPTIVE NOTE   Final Rept 15 Aug 84 15 Aug 85.

NOV 85   24P

PERSONAL AUTHORS Hart Douglas ;Mongeau Peter P ;Kolm,
Henry H

REPORT NO   EML-85-AF002

PROJECT NO   2308

TASK NO   A1

MONITOR AFOSR
         TR 86-0933

UNCLASSIFIED REPORT

ABSTRACT   (U) Metal rings placed close to a pulsed field
coil have been accelerated at 200 million gee to 5 km/s
in a 2 cm length by Bandoletov in the USSR Bandoletov,
1977 We have studied the basic phenomena and ultimate
limitations of the pulsed induction process both
theoretically and experimentally to determine its
usefulness as a reaction engine It is possible in
principle to accelerate metal rings at high efficiency,
and impart sufficient energy to ensure melting and
evaporation so that the reaction mass is ultimately
ejected in the form of plasma In practice the process is
limited by electrical, mechanical and thermal failure of
the induction coil Over a hundred shots were fired
including several in which 12 gram rings were accelerated
to over 700 m s at efficiencies above 30 percent. This is
equivalent to the performance of a high power rifle with
a one inch long barrel An unexpected result of these
studies is the discovery that to achieve maximum velocity,
the mutual inductance gradient between induction coil and
projectile ring in the firing position must be reduced to
minimize the initial acceleration This reduces the back-
voltage and increases the interaction time, resulting in
maximum energy transfer

DESCRIPTORS   (U) *ELECTRIC PROPULSION *MAGNETIC
INDUCTION *ION ENGINES MASS MELTING LAUNCHERS SPACE

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PROPULSION ESCAPE VELOCITY PLASMAS PHYSICS METALS
RINGS ENERGY TRANSFER MAGNET COILS THRUSTERS, HIGH
ACCELERATION PULSES MAGNETIC FIELDS

IDENTIFIERS (U) Reaction engines Electromagnetic
launchers Pulse coils Pulsed power Induction reaction
engines WUAFOSR2308A1 PE61102F

DTIC REPORT BIBLIOGRAPHY

AD-A173 321   7-4   20 10

AD-A173 321   CONTINUED

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

ENTHALPY. HEAT OF REACTION. ACTIVATION ENERGY

(U) MNDO Parameters for Silicon. Revision.
86   7p

IDENTIFIERS: (U) MNDO(Modified Neglect of Differential
Overlay), WUAFOSR2303B2, PE61102F

PERSONAL AUTHORS: Dewar Michael J , Friedheim James
Grady Gilbert , Healy Eamonn F , Stewart James J

CONTRACT NO   F49620-83-C-0024

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
TR-86-1049 REV

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in Organometallics v5 n2 p375
379 1986

ABSTRACT   (U)   While MNDO calculations using the
original parameters for silicon have given satisfactory
results in many cases, recent extensive calculations
here and elsewhere have revealed certain inadequacies.
In particular calculations with the previous parameters
showed an undue preference for divalent silicon. One
manifestation of this was to be seen in reactions
involving SiR2 species. Reactions involving the formation
of such silylenes were invariably predicted to be much
too exothermic. The original MNDO version also performed
badly for compounds containing multiply bonded silicon
greatly underestimating the strength of the multiple
bonds. For example, silaethylene and silaacetylene were
predicted to have bond orders of 1 and 2 respectively.
Large errors also occurred in calculations for compounds
of silicon with other heteroatoms, most notably oxygen.
MNDO has been reparametrized for silicon. The results for
a wide variety of silicon-containing compounds are in
much better agreement with experiment. Enthalpies of
reaction and activation are compared with results from
recent high level ab initio calculations.

DESCRIPTORS   (U)   SILICON, ACTIVATION THEORY, REPRINTS,
HEAT OF FORMATION. IONIZATION POTENTIALS, DIPOLE MOMENTS,
SILICON COMPOUNDS. VIBRATIONAL SPECTRA, PARAMETERS,

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO EVN54B

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BRISTOL UNIV (ENGLAND) DEPT OF INORGANIC CHEMISTRY

PITTSBURGH UNIV PA SURFACE SCIENCE CENTER

(U) Heteronuclear Star Clusters (Ni2Pt2W4 (mu3-CPh)4(CO)
8 (eta-C5H5)4) and (Ni2Pt2W4 (mu2-CR)(mu3 CR)3 (CO)
8(eta-C5H5)4) (R=Ph or p-C6H4Me)

(U) ESDIAD (Electron Stimulated Desorption Ion Angular
Distribution) Studies of the Structure of Species
Chemisorbed on Ni(110). The Surface Bonding of NH3.
NH2, and CO.

DESCRIPTIVE NOTE   Journal article

OCT 84   6P

FEB 86   4P

PERSONAL AUTHORS   Elliott,Gregory P. ;Howard,Judith A. ;
Mise,Takaya ;Nunn,Christine M ;Stone,F. G ;

PERSONAL AUTHORS   Yates,John T. , Jr.;Klauber,C. ;Alvey,M.
D. ;Metiu,H. M. ;Lee,J. ;

CONTRACT NO.   NSF-CHE83-10106

PROJECT NO   2303

PROJECT NO.   2310

TASK NO   B2

TASK NO.   A2

MONITOR   AFOSR
TR 86 1042

MONITOR   AFOSR
TR-86-1060

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) Treatment of the trimetal compounds.
PtW2(mu2-CR)2(CO)4(Eta-C5H5)2 (R=Ph or C6H4Me-4) with bis
(cyclo-octa 1,5-diene) nickel affords separable mixtures
of the cluster compounds Ni2Pt2W4(Mu3-CR)4(CO)8(Eta-C5H5)
4 and Ni2Pt2W4,Mu2 CR)(Mu3-CR)3(CO)8(n-C5H5)4. An X-ray
diffraction study on Ni2Pt2W4/Mu3 CPH)4(CO)8(Eta-C5H5)4
has revealed a novel 'star' configuration for the eight
metal atoms

ABSTRACT: (U) In this paper it will be shown that ESDIAD
(Electron Stimulated Desorption Ion Angular Distribution)
can give detailed information about both the structural
and the dynamic behavior of surface species. There are at
present few physical measurement techniques in surface
science which give such detailed information about
surface bonding in polyatomic adsorbates. We have
investigated the process: NH3(ads) yields > NH2(ads) +
H(ads). Here, the NH3 molecule is found to bond by an
electron donor mechanism to the ridge atop sites of the
corrugated Ni(110) surface, and to exhibit either no
preferential azimuthal orientation, or essentially free
rotation. For temperatures at low as 29K, a halo H+
pattern is observed, indicating that the barrier to NH3
rotation is below about 0.07 eV. In contrast, the NH2
species is frozen azimuthally on the surface with its
plane perpendicular to the Ni rows, yielding two sharp H+
beams in ESDIAD. This surface bonding mode is consistent
with the molecular orbital structure of NH2. The NH2
species is thermally stable to about 375K

DESCRIPTORS   (U) ;METAL COMPOUNDS. ;HETEROCYCLIC
COMPOUNDS. ;PLATINUM. ;TUNGSTEN. ORGANIC PHOSPHORUS
COMPOUNDS. ISOMERS. REPRINTS. CARBONYL COMPOUNDS. METHYL
RADICALS. DIENES. NICKEL. CLUSTERING. MOLECULAR STRUCTURE.
LIGANDS

IDENTIFIERS   (U) Tetrahydrofuran WUAFOSR2303B2.
PE61102F

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DTIC REPORT BIBLIOGRAPHY

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DESCRIPTORS: (U) *CHEMISORPTION, AMMONIA, CARBON
MONOXIDE, REPRINTS, SURFACE CHEMISTRY, MOLECULAR
STRUCTURE, NICKEL, DESORPTION, TEMPERATURE, ADSORPTION,
ROTATION, AZIMUTH

IDENTIFIERS: (U) ESDIAD Electron Stimulated Desorption
Ion Angular Distribution, WUAFOSR2310A2, PE61102F

SEARCH CONTROL NO. EVN54B

AD-A173 310   20/4   14/2

MICHIGAN STATE UNIV EAST LANSING TURBULENCE STRUCTURE
LAB

(U) Experimental Study of Turbulence Production Mechanisms
in Boundary Layer Flows

DESCRIPTIVE NOTE: Final rept. 1 Oct 82-30 Sep 84.

MAY 85   76P

PERSONAL AUTHORS: Falco,R E

REPORT NO.   TSL-85-1

CONTRACT NO. F49620-82-K-0003

PROJECT NO.   2307

TASK NO.   A2

MONITOR: AFOSR
            TR-86-0960

UNCLASSIFIED REPORT

ABSTRACT: (U)   Studies of turbulence structure near a
wall show that the production process has many
manifestations. Detailed experiments, involving visual
information in two mutually orthogonal planes, and
simultaneous multiple hot-wire anemometry, along with
both experimental and numerical simulations were
performed in an attempt to determine the underlying
conceptual framework. Results indicate that the wide
variety of evolutions observed during the turbulence
production process near a wall are all manifestations of
the evolution of vortex ring-like eddies with the wall
and the wall layer. Additional important evolutions
result from the interaction of two of these vortex ring
wall interactions occurring with small spatial and
temporal differences. Boundary layer interactions have
been divided into /4) classes ranging from weak
interactions to ones producing strong turbulence. These
classes were simulated experimentally vortex ring moving
wall interactions, and within the constraints of two
dimensions--qualitatively by simple numerical vortex-in
cell simulations. The instantaneous local thickness of
the viscous sublayer and the flow field of the large
scale motions play dominant roles in determining which

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Class of evolution is observed.

DESCRIPTORS: (U) *TURBULENCE, *EDDIES/FLUID MECHANICS,
*BOUNDARY LAYER, WALLS, VORTICES, PRODUCTION, RINGS,
INTERACTIONS, STRUCTURAL PROPERTIES, VISCOSITY, LAYERS,
THICKNESS, CONVECTION, EVOLUTION/GENERAL, MODEL TESTS,
MATHEMATICAL MODELS, FLOW VISUALIZATION, HOT WIRE
ANEMOMETERS, DRAG, HEAT TRANSFER

IDENTIFIERS: (U) Turbulence production, Vortex in cell,
Vorticity, PE61102F

AD-A173 305   9/1   9/5

CINCINNATI UNIV OH SOLID STATE ELECTRONICS LAB

(U) Integration of Detectors with Optical Waveguide
Structures.

DESCRIPTIVE NOTE: Interim rept. 15 Mar 85-15 Mar 86.

MAY 86   27P

PERSONAL AUTHORS: Boyd, J. T. ;

CONTRACT NO.   F49620-85-C-0044

PROJECT NO.   2305

TASK NO.   B1

MONITOR: AFOSR
            TR-86-0817

UNCLASSIFIED REPORT

ABSTRACT: (U)   Major accomplishments during this report
period occurred in the areas of (1) photodetectors formed
on optical waveguide surfaces; (2) high-speed
complementary metal-oxide-semiconductor electronic
devices for signal processing circuitry associated with
these photodetectors, (3) improved techniques for laser
recrystallization of silicon, (4) low loss optical
waveguides, (5) theoretical analysis of low loss optical
waveguides on silicon and gallium arsenide substrates,
and (6) characterization of the materials used in the
above devices by Raman spectroscopy with microprobe.

DESCRIPTORS: (U)   *OPTICAL WAVEGUIDES, *PHOTODETECTORS,
LOW LOSS, COMPLEMENTARY METAL OXIDE SEMICONDUCTORS,
SIGNAL PROCESSING, CIRCUITS, RECRYSTALLIZATION, SILICON,
LASER APPLICATIONS, SILICON, GALLIUM ARSENIDES,
SUBSTRATES, RAMAN SPECTROSCOPY, INTEGRATED SYSTEMS

IDENTIFIERS: (U)   PE61102F

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DTIC REPORT BIBLIOGRAPHY

AD-A173 295   7/4   20/10

CALIFORNIA INST OF TECH PASADENA DIV OF CHEMISTRY AND CHEMICAL ENGINEERING

(U) Theoretical and Experimental Studies in Reactive Scattering.

DESCRIPTIVE NOTE: Final rept. 1 Oct 82-30 Sep 85.

AUG 86   428P

PERSONAL AUTHORS: Kuppermann,Aron ;

CONTRACT NO   AFOSR-82-0341

PROJECT NO   2303

TASK NO.   B1

MONITOR: AFOSR
TR-86-0870

UNCLASSIFIED REPORT

ABSTRACT. (U) This project performed accurate calculations of chemical reaction cross sections for collinear and three dimensional systems of importance for the fundamental aspects of chemical dynamics and for advanced technologies of interest to the United States Air Force. Some of these calculations are used to test different transition state theories. Experiments involving beams of He atoms, H atoms and metastable H3 molecules are performed aimed at the determination of potential energy surfaces involving these systems.

DESCRIPTORS: (U) *QUANTUM CHEMISTRY, *CHEMICAL REACTIONS, REACTION KINETICS, QUANTUM THEORY, CROSS SECTIONS, HELIUM, ATOMIC BEAMS, HYDROGEN, ATOMS, MOLECULES, METASTABLE STATE, DYNAMICS, THREE DIMENSIONAL, POTENTIAL ENERGY, SURFACES, EXCHANGE REACTIONS, ANISOTROPY, MODELS

IDENTIFIERS: (U) Atom Molecule interactions

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PAGE   27   EVN54B

AD-A173 296   17/2 1

CALIFORNIA UNIV BERKELEY DEPT OF PHYSICS

(U) Quantum Limits of Superconducting Heterodyne Receivers.

DESCRIPTIVE NOTE: Annual rept 15 May 85-14 May 86.

AUG 86   5P

PERSONAL AUTHORS: Richards,Paul L ;

CONTRACT NO   AFOSR-85-0230

PROJECT NO   2305

TASK NO.   C3

MONITOR   AFOSR
TR-85-0833

UNCLASSIFIED REPORT

ABSTRACT. (U) The goal of this research is to produce quantum limited SIS quasiparticle heterodyne receivers at submillimeter wavelengths. The approach used is to build prototype matching structures for 90 GHz and test them thoroughly. These matching structures will then be scaled to smaller dimensions to investigate their performance at submillimeter wavelengths. Substantial progress has been made toward these goals during the first grant year.

DESCRIPTORS: (U) *MIXERS(ELECTRONICS), HETERODYNING, LIMITATIONS, MATCHING, PARTICLES, PROTOTYPES, QUANTUM THEORY, RECEIVERS, SUBMILLIMETER WAVES, SUPERCONDUCTORS, RADIO RECEIVERS, EXTREMELY HIGH FREQUENCY

IDENTIFIERS: (U) SIS(Superconductor Insulator Superconductor), Quasiparticle heterodyne receivers, PE61102F, WUAFOSR2305C3

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD A173 294   21 5   20/4   AD-A173 294   CONTINUED

WUAFOSR2307A4

TENNESSEE UNIV SPACE INST TULLAHOMA

(U) Contamination and Distortion of Steady Flow Field
Induced by Various Discrete Frequency Disturbances in
a Aircraft Gas Turbines.

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 85.

APR 86   181P

PERSONAL AUTHORS: Kurosaka,M. ;

CONTRACT NO: AFOSR-83-0049

PROJECT NO: 2307

TASK NO: A4

MONITOR: AFOSR
TR-86-0820

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Original contains color plates. All
DTIC and NTIS reproductions will b. in black and white

ABSTRACT: (U) The objective of this investigations was
to acquire a fundamental understanding of two
aerothermodynamic effects of vortices as related to
aircraft gas turbines: (a) the total temperature and
total pressure separation; and (b) the negative entropy
spots. In the period covered here: the theoretical
explanation for (a) has been finished and it was found
that the separation of total temperature and pressure is
caused by the time-varying static pressure field around
vortices; they were in favorable agreement with the
preliminary experimental results obtained by an
aspir ition probe. Preparations for the search of negative
entro y spots around vortices were also made. Keywords:
Karman vortex street, negative entropy.

DESCRIPTORS: (U) *VORTICES, *FLOW FIELDS, *STEADY FLOW,
AEROTHERMODYNAMICS, AIRCRAFT, ASPIRATORS, CONTAMINATION,
DISTORTION, ENTROPY, FREQUENCY, GAS TURBINES, PRESSURE,
PROBE., SEPARATION, STATIC PRESSURE, TIME, VARIATIONS,
ENTROPY

IDENTIFIERS: (U) Negative entropy, PE61102F,

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DTIC REPORT BIBLIOGRAPHY

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TUFTS UNIV MEDFORD MA DEPT OF PHYSICS

ACTIVITY, LOOPS, BREMSSTRAHLUNG, SUNSPOTS, ELECTRON ENERGY, MAGNETIC FIELDS

(U) Compact Variable, Moving Sources on the Sun at 2 CM Wavelength.

IDENTIFIERS: (U)   VLA(Very Large Array), Magnetograms, PE61102F

SEP 86   8P

PERSONAL AUTHORS: Lang,Kenneth R. ;Willson,Robert F. ;

CONTRACT NO   AFOSR-83-0019

PROJECT NO   2311

TASK NO   A1

MONITOR   AFOSR TR 86 0987

UNCLASSIFIED REPORT

ABSTRACT: (U)   The high angular resolution provided by the Very Large Array (VLA) has permitted the spatial resolution of solar microwave sources and opened the way for comparisons with observations of similar angular resolution at optical and X ray wavelengths. High resolution VLA observations of solar active regions at relatively long wavelengths of 6 cm and 20 cm have, for example, led to the discovery of the microwave counterpart of the ubiquitous coronal loops that had previously only been observed by x ray telescope lofted above the Earth s atmosphere. The microwave emission of the coronal loops is attributed to the gyroresonant radiation and or the bremsstrahlung of million-degree thermal electrons trapped within the loops by strong magnetic fields; observations of this emission have provided valuable new insights into the nature of solar active regions and eruptions from the Sun and nearby stars. In contrast, the short wavelength 2 cm emission of solar active regions is poorly understood. In spite of numerous VLA solar observations at 2 cm there are only two published results. In both instances, compact angular sizes about 15 sec.), highly polarized (degree of circular polarization 80% to 90%) sources were found in regions of strong magnetic field (strength H about 2,000 G) above sunspots

DESCRIPTORS: (U):   (SOLAR RADIATION, (MICROWAVES, SOLAR CORONA, EMISSION SPECTRA, RADIO TELESCOPES, X RAYS, SOLAR

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AD-A173 276   14/2   20 E   7/4

YALE UNIV NEW HAVEN CT DEPT OF MECHANICAL ENGINEERING

(U) Proposal for Research Instrumentation

DESCRIPTIVE NOTE: Final rept 1 Jul 83-30 Jun 84.

DEC 85   23P

PERSONAL AUTHORS: Long,Marshall B. ;Chang,Richard K. ;Chu, Boa-Teh ;

CONTRACT NO.   AFOSR-83-0285

PROJECT NO.   2308

TASK NO.   A3

MONITOR: AFOSR TR-86-0928

UNCLASSIFIED REPORT

ABSTRACT: (U)   A summary is given of the progress to date using two new laser/multichannel detection systems obtained with DoD-University Research Instrumentation Program funding. Progress has been made in several different areas including: (1) high-speed mapping of gas concentrations in turbulent flows, (2) use of Rayleigh scattering for temperature mapping in turbulent diffusion flames, (3) measurement of the full three-dimensional scalar gradient in a plane, and (4) measurement of multipoint three-component velocities in a large volume. A summary of research in these areas is given along with a description of future studies to be carried out using the equipment acquired under this program. Keywords: laser diagnostics.

DESCRIPTORS: (U)   *DIAGNOSIS(GENERAL), *LASERS, *INSTRUMENTATION, *FLAMES, *MAPPING, *TEMPERATURE, DIFFUSION, GRADIENTS, RAYLEIGH SCATTERING, SCALAR FUNCTIONS, THREE DIMENSIONAL, TURBULENCE, TURBULENT FLOW, VOLUME

IDENTIFIERS: (U)   PE61102F, WUAFOSR2308A3

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AD-A173 278   7/4

GEORGIA INST OF TECH ATLANTA SCHOOL OF PHYSICS

(U) Basic Expression for the Rates of Termolecular Recombination and Dissociation

DESCRIPTIVE NOTE: Rept for 1 Jul 85-14 Feb 86.

85   6P

PERSONAL AUTHORS: Flannery,M. R. ;

REPORT NO.   GIT-85-007

CONTRACT NO.   AFOSR 84-0233

PROJECT NO.   2301

TASK NO.   A4

MONITOR: AFOSR TR-86-0969

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physics B: Atomic and Molecular Physics, v18 pL839-L844 1985.

ABSTRACT   (U)   It is noted that the usual identification of the rate R Superscript A (t) for termolecular recombination at time t with the downard current past a bound energy level is appropriate to cases which involve energy distributions that satisfied the quasi-steady state (QSS) condition to the exact master equation. A general expression for R superscript A (t) is derived which is valid for both QSS and non-QSS distributions, such as those non QSS distributions obtained from both the diffusional and variational methods or from numerical approximation to the exact QSS condition.

DESCRIPTORS: (U)   *RECOMBINATION REACTIONS, REPRINTS, TRANSPORT PROPERTIES, DISSOCIATION, DISTRIBUTION, ENERGY, ENERGY LEVELS, EQUATIONS, VARIATIONAL METHODS, THERMAL PROPERTIES

IDENTIFIERS: (U)   WUAFOSR2301A4

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A173 271   12/1

MICHIGAN UNIV ANN ARBOR DEPT OF ELECTRICAL ENGINEERING
AND COMPUTER SCIENCE

(U) Block-Oriented, Local-Memory-Based Linear Equation
Solution on the CRAY-2.

AUG 86   5P

PERSONAL AUTHORS: Calahan, D. A.

PROJECT NO.   2304

TASK NO.   A2

MONITOR: AFOSR
TR-86-1039

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Proceedings of the
International Conference on Parallel Processing, n.p.,
Aug 86

ABSTRACT: (U)   The performances of a number of algorithms
for the solution of (dense) linear equations are
presented for the CRAY-2. Measurements show as much as a
6:1 speedup of blocked algorithms over conventional
vectorized Gauss elimination. Execution rates in the
range of 400 MFLOPS are achieved.

DESCRIPTORS: (U)   'LINEAR ALGEBRA, ALGORITHMS.
SUPERCOMPUTERS, SOLUTIONS(GENERAL), LINEAR ALGEBRAIC
EQUATIONS, COMPUTER ARCHITECTURE. REPRINTS

IDENTIFIERS: (U)   CRAY 2 Supercomputer. PE61102F.
WUAFOSR2304A2

AD-A173 273   7/3   7/4

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) 29Si NMR Observation of an Unprecedented Rearrangement
in Tetraaryldisilenes

86   4P

PERSONAL AUTHORS: Yokelson, Howard B   ; Maxka, Jim ; Siegel,
David A   ; West, Robert .

CONTRACT NO   F49620-86-C-0010

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
TR-86-C956

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub. in Jnl   of the American Chemical
Society. v108 p4239-4241 1986.

ABSTRACT   (U)   We report here the first observation of a
facile intramolecular rearrangement of tetraaryldisilenes
involving the exchange of two aryl substitutents between
the silicon atoms of the silicon silicon double bond The
disilenes were generated photochemically by irradiation
of their trisilane precursors in pentane solution at -60
C and the crude photolysates were monitored by Silicon 29
NMR in benzene. Pure disilenes were produced by
photolysis of trisilanes and gave in each case only a
single Silicon 29 signal in the disilene region, at 63 68
and 64 05 ppm respectively.

DESCRIPTORS   (U)   'SILICON COMPOUNDS   'ARYL RADICALS.
'MOLECULAR STRUCTURE 'SPECTROSCOPY, NUCLEAR MAGNETIC
RESONANCE. MOLECULE MOLECULE INTERACTIONS. EXCHANGE
REACTIONS. PHOTOLYSIS. SILANES. REPRINTS

IDENTIFIERS   (U)   PE61102F, WUAFOSR2303B2

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A173 270   20 5

AD-A173 267   7/3

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF
ELECTRONICS

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) Off-Axis Electron Orbits in Realistic Helical Wigglers
for Free Electron Laser Applications.

(U) Cruciaromaticity in Organometallic Compounds.

DEC 85   7p

86   9p

PERSONAL AUTHORS   Fajans,J. ;Kirkpatrick,D. A. ;Bekefi,G

PERSONAL AUTHORS   Dewar,Michael J. ;Healy,Eamonn F. ;Ruiz,
James .

CONTRACT NO   AFOSR-84-0026

CONTRACT NO.   F49620-83-C-0024

PROJECT NO   2301

PROJECT NO.   2303

TASK NO   A1

TASK NO   B2

MONITOR   AFOSR
TR 86 0968

MONITOR.   AFOSR
TR-86-1058

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U)   Off-axis electron orbits in free electron
laser beams of finite thickness, subjected to combined
helical wiggler and axial guide fields, have been studied
analytically. A semiempirical equation for the electron
velocity components, averaged over the electron's
oscillatory betatron motion, has been derived as a
function of the radial displacement of the radial
displacement of the electron guiding center. The
predictions from the equation are compared with single
particle numerical simulations, and with free electron
laser experiments. Good agreement is found

SUPPLEMENTARY NOTE: Pub. in Pure and Applied Chemistry,
v58 n1 p67-74 1986.

ABSTRACT: (U)   A recent suggestion, that transition metal
complexes of unsaturated ligands can be regarded as
cruciconjugated, is explored by studies of various
complexes of Fe(II), the aromaticity of the resulting pi
systems being analyzed in terms of PMO theory. This
approach is also applied to porphyrin. The conclusions
are supported by preliminary pi SCF and MNDO calculations.

DESCRIPTORS: (U)   *FREE ELECTRON LASERS. *LASER BEAMS.
PUMPING(ELECTRONICS). BETATRONS. COMPARISON. SIMULATION.
GAIN. REPRINTS

DESCRIPTORS: (U)   *ORGANOMETALLIC COMPOUNDS. *TRANSITION
METAL COMPOUNDS. *AROMATIC COMPOUNDS. LIGANDS. METAL
COMPLEXES. IRON. PORPHYRINS. SPIN STATES. COMPUTATIONS.
REPRINTS

IDENTIFIERS: (U)   Wiggler Magnets. PE61102F.
WUAFOSR2230141

IDENTIFIERS: (U)   Conjugation. PE61102F. WUAFOSR230382

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVN54B

AD A173 265   3 2   OF 14

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TUFTS UNIV MEDFORD MA DEPT OF PHYSICS

IDENTIFIERS   (U) Coronal Loops VLA(Very Large Arrays),
PE61102F, WUAFOSR2311A1

(U) Coronal Plasmas on the Sun and Nearby Stars

SEP 86   12P

PERSONAL AUTHORS   Lang Kenneth R

CONTRACT NO   AFOSR 83-0019 N00014-???-?-????

PROJECT NO   2311

TASK NO   A1

MONITOR   AFOSR
TR 86-0995

UNCLASSIFIED REPORT

ABSTRACT   (U)   The very large array which has been used to
observe solar microwave radiation with second of arc
angular resolution both the quiescent sun and flaring
microwave sources and flaring ones are usually
resolved into one or more associated with the apex and or
legs of two ubiquitous coronal loops which heretofore
have been observable only with x ray telescopes seen
above the atmosphere Multiple wavelength VLA
observations can specify the strength, resolution and
structure of the magnetic field within coronal loops while
also providing constraints on the temperature, density and
electron temperature of the plasma trapped within the
coronal loops. This spot section   discusses the
thermal radiation mechanisms that   most of the
quiescent sources while also   that out that quiescent
amplified magnetic fields of loops   radiation may be
required in some instances This   provided by a
discussion of th 6 20 cm radiation   coronal loops, and
the thermal cyclotron lines that   specify their
magnetic field strength The 20 cm and x ray emission of
the coronal plasma are then compared The coronae of
nearby stars are discussed where coronal radiation
processes seem to predict

DESCRIPTORS   (U)   SOLAR RADIATION MICROWAVES EMISSION
SPECTRA SOLAR CORONA PLASMAS PHYSICS X RAYS MAGNETIC
FIELDS PLASMA TEMPERS TEMPERATURE DENSITY ELECTRON
ENERGY FREE STREAMING RESONANCE RADIATION

AD A173 265

AD A173 265

AD-A173 255   11 4

TEXAS A AND M UNIV COLLEGE STATION DEPT OF MECHANICAL ENGINEERING

(U) Delamination Fracture in Graphite/Epoxy Materials.

DESCRIPTIVE NOTE: Annual rept 1 Apr 85-31 Mar 86.

JUN 86   183P

PERSONAL AUTHORS: Bradley,Walter L.

CONTRACT NO: AFOSR-84-0064

PROJECT NO: 2302

TASK NO: B2

MONITOR: AFOSR
TR-86-0941

UNCLASSIFIED REPORT

ABSTRACT: (U) Contents: Objectives; Summary Work Statement; Summary of Accomplishments by Areas in Work Statement; In-situ Fracture Observations, Crack tip Strain Field Measurements, Fracture Mechanics Characterization, Micromechanics Modeling, Fractography and Failure Analysis, Publications Resulting in Whole or in Part from Work Supported by AFOSR; Professional Personnel Associated with Research Effort; Presentations; Summary of Significance of Accomplishments; Papers; Micromechanics of Fracture in Toughened Graphite/Epoxy Laminates, A Comparison of the Crack Tip Damage Zone for Fracture of Hexcell F185 Neat Resin and T6C145/F185 Composite, The Relationship of Resin Ductility and Composite Delamination, Delamination Analysis of Composites with Distributed Damage using a J integral, Correlation Between Micromechanical Failure Processes and the Delamination Fracture Toughness of Graphite Epoxy Composite, The Meaning and Significance of Hackles in Composite Materials Failure Analysis

DESCRIPTORS: (U) *EPOXY COMPOSITES, *FRACTURE(MECHANICS), GRAPHITE MATERIALS, LAMINATES, LAYERS

IDENTIFIERS: (U) *Delamination, PE61102F, WUAFOSR2302B2

AD-A173 255

AD-A173 256

PITTSBURGH UNIV PA SURFACE SCIENCE CENTER

(U) Metastable Angular Distributions from Electron Stimulated Desorption

JAN 86   5P

PERSONAL AUTHORS: Alvey,Mark D Dresser,Miles J Yates,John T Jr

CONTRACT NO: AFOSR-82-0133

PROJECT NO: 2303

TASK NO: A2

MONITOR: AFOSR
TR-86-0229

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub in Physical Review Letters, v56 n4 p367 27 Jan 86.

ABSTRACT: (U) We have for the first time measured by electron stimulated desorption the angular distribution of electronically excited metastable species from CO adsorbed on Ni(110). The angular distribution of metastable desorption is strongly peaked in normal direction as is also found for ionic desorption products. This indicates that the metastable is repelled along the direction of the bond being broken. We also observe an asymmetry in the azimuthal angular distribution which is correlated with the substrate crystal structure. The metastable exhibits a maximum in its yield versus coverage

DESCRIPTORS: (U) *DESORPTION, *CARBON MONOXIDE, ANGLES, ASYMMETRY, AZIMUTH, CRYSTAL STRUCTURE, DISTRIBUTION, METASTABLE STATE, SUBSTRATES, ELECTRON TRANSFER, ADSORPTION, NICKEL, REPRINTS

IDENTIFIERS: (U) PE61102F, WUAFOSR2303A2

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DTIC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. EVN54B

AD A173 254   20 12   20 2

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

(U) Strength and Structure of GA-1 v IN x ... Alloys

DESCRIPTIVE NOTE   Quarterly rept no 3   1 May 31 Aug 86

JUL 86   11P

PERSONAL AUTHORS   Faber,Katherine T ;Hirth,John P

CONTRACT NO   F49620 85 C 0129   ARPA order 5526

PROJECT NO   2917

TASK NO   A2

MONITOR   AFOSR
TR 86 0815

UNCLASSIFIED REPORT

ABSTRACT   (U)   The strengthening effect of gallium
arsenide by indium additions is under examination.
Interpretation of high temperature hardness results of In
free and In containing GaAs suggests that the
interpretation of the hardening of these orders of
magnitude during growth. The third quarterly report
describes the most recent appearance efforts in this study
...
In the previous report ... purposes
...
...
...
...
...
... in addition
to consistency with solution hardening ... possible
in polycrystalline germanium reduced ... pped GaAs.

DESCRIPTORS   (U)   GALLIUM ARSENIDES   DOPING   INDIUM
STRENGTH MECHANICS   TEST METHODS   PROPERTIES   HIGH
TEMPERATURE   MECHANICAL PROPERTIES   CRYSTAL STRUCTURE
STRENGTH MECHANICS   COMPRESSIVE PROPERTIES   WAFERS

IDENTIFIERS   (U)   PE61102F   WUAFOSR2917A2   LFN QSURF
...

AD A173 254

AD A173 252   7 3   7 4

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) A MINDO 3 Study of the Ethylene Dication.

DESCRIPTIVE NOTE

JUL 85   7P

PERSONAL AUTHORS   Dewar,Michael J. ;Reynolds,Charles H.

CONTRACT NO.   F49620 83-C 0024

PROJECT NO.   2303

TASK NO.   B2

MONITOR   AFOSR
TR 86 1055

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in Jnl of Molecular Structure
(Theochem) v136 p209-214 1986

ABSTRACT   (U)   Mass spectral evidence was recently
presented for the formation of the dication derived from
ethylene. Since this seems to be the smallest organic
dication whose existence has been unequivocally
demonstrated, its structure and other properties are of
theoretical interest. The original report included the
results of an ab initio calculation for the dication
which, however, was carried out assuming its geometry to
be the same as that of ethylene. Since the geometry was
not optimized, this amounted to a calculation of the
vertical double ionization of ethylene and did not
address either the structure or the properties of the
ground state dication itself. This gap has been filled by
a recent ab initio investigation by Lammertsma et al. in
which the C2H4++ potential surface was explored in some
detail. Five stationary points were located, of which,
however, only one proved to be a definite minimum, this
having a D sub 2d structure in which the methylene groups
are planar but orthogonal to one another. MINDO 3
calculations are reported for the dication. C2H4++
derived from ethylene. Four minima, corresponding to
species of similar energies, were located on the
corresponding potential surface.

DESCRIPTORS   (U)   *ETHYLENE   *CATIONS   MASS SPECTRA
SURFACES   GROUND STATE   METHYLENES   IONIZATION   VERTICAL

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DTIC REPORT BIBLIOGRAPHY

AD-A173 252   CONTINUED

AD-A173 251   7/3   20/10

ORIENTATION   COMPUTATIONS   MASS SPECTROSCOPY   MOLECULAR
STRUCTURE   ISOMERS

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

IDENTIFIERS   U   MINDO;Modified Intermediate Neglect of
Differential Overlap) Dications   WUAFOSR2303B2   PE61102F

(U) MNDO Study of the Reaction of Tetramethylstannane with
Bromine.

86   3P

PERSONAL AUTHORS: Dewar,Michael J. ;Kuhn,Daniel R. ;

CONTRACT NO.   F49620-83-C-0024

PROJECT NO.   2303

TASK NO.   B2

MONITOR: AFOSR
TR-86-1057

UNCLASSIFIED REPORT

ABSTRACT: (U)   The mechanism of the brominolysis of alkyl
tin compounds has been considerable interest to
organometallic chemists primarily due to the observation
of stereochemical inversion, as well as retention, at
carbon under certain conditions. A wide range of
mechanistic pathways have been proposed for this reaction,
which has been found, in general, to be first order in
both Br2 and the alkyltin. These proposed mechanisms
included both concerted, stepwise, and charge-transfer
processes. To rationalize the observed stereochemistry at
carbon, three transition states (TS) have been proposed

DESCRIPTORS: (U)   *TIN COMPOUNDS, *STEREOCHEMISTRY,
*METHYL RADICALS, CARBON, CHEMISTS, ORGANOMETALLIC
COMPOUNDS, TRANSITIONS, BROMINE, CHARGE TRANSFER,
RANGE(EXTREMES), CHEMICAL REACTIONS, SUBSTITUTION
REACTIONS, COMPUTATIONS, MATHEMATICAL MODELS, REPRINTS

IDENTIFIERS: (U)   MNDO(Modified Neglect of Differential
Overlap), WUAFOSR2303B2, PE61102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A173 249   4-2   17 9

AD-A173 249   CONTINUED

CONTROL DATA CORP MINNEAPOLIS MN METEOROLOGY RESEARCH CENTER

(U) Variability of Turbulence. 4-20 km in Colorado and Alaska from MST (Mesosphere. Stratosphere. Troposphere, Radar Observations.

MAY 86   14P

PERSONAL AUTHORS: Nastrom,G D   Gage K S   Ecklund,W L

CONTRACT NO   F19620 82 C 0029

PROJECT NO   2 10

TASK NO   A1

MONITOR   AFGSP
    TR AG 0971

UNCLASSIFIED REPORT

ABSTRACT   (U)   The variability of small scale atmospheric turbulence on time scales from a few minutes to the annual scale and at altitudes from about 4 to 20 km is studied using clear air Doppler radar data from Poker Flat, Alaska, and Platteville, Colorado. The variable used for this study is the refractivity turbulence structure constant (C sub n squared) the frequency distribution of C sub n squared is found to be lognormal during all seasons at all altitudes. Using data at 4 min intervals, it is found that the autocorrelation function of C sub n squared can be modeled as a random process. The order autoregressive process and the sum of a first order autoregressive process and a random process. The associated integral time scale increases with altitude from 25 to 45 min in the troposphere to about 18 min in the stratosphere. The power spectrum of log (C sub n squared follows a power law relation with frequency. at periods greater than about 2 hours the spectral slope is near 5 3 and at periods less than 2 hours the slope is near 1. Monthly mean values of log (C sub n squared are increased in the winter and show a secondary maximum in summer. The winter peak is apparently related to increased jet stream and baroclinic storm activity, and

the summer peak is believed to be due to convective activity. The correlation of 3 hour values of (C sub n) squared with wind speed over monthlong periods ranges as high as 0.8 and has a median value near 0.3. During certain periods. (C sub n)squared also depends on other variables such as boundary layer inversions and gravity wave activity.

DESCRIPTORS: (U) *ATMOSPHERIC MOTION. *RADAR REFLECTIONS. TURBULENCE. ATMOSPHERIC REFRACTION. TROPOSPHERE. REGRESSION ANALYSIS. GRAVITY WAVES. TEMPERATURE INVERSION. POWER SPECTRA. SEASONAL VARIATIONS. PEAK VALUES. WIND VELOCITY. BOUNDARY LAYER. REPRINTS

IDENTIFIERS. (U) WUAFOSR2310A1. Pe6110F

AD A173 249

AD-A173 245   11/6

ARIZONA STATE UNIV TEMPE COLL OF ENGINEERING AND APPLIED SCIENCES

(U) Investigation of Material Problems for High Temperature. High Power Space Energy-Conversion Systems.

DESCRIPTIVE NOTE: Final rept. 1 May 83-30 May 86.

JUL 86   415P

PERSONAL AUTHORS: Jacobson,Dean L.;Morris,James F.; Ramalingam,Mysore;Snir,Shlomo ;Bice,Charles ;

CONTRACT NO.   AFOSR-83-0067

PROJECT NO.   2308

TASK NO.   K1

MONITOR: AFOSR
            TR-86-0819

            UNCLASSIFIED REPORT

ABSTRACT: (U)   The final report has been divided in six sections. The first one is an introduction. In the second section. the theory of dilute-solutions ultralloys from tungsten sintering with special eutectic applications is presented. together with a comprehensive literature survey including 95 references. In the third one. the results for the work function evaluation of tungsten-rhenium sintered alloys. obtained by using thermionic emission microscopy, are presented. The influence of rhenium content in the range 3 percent to 30 percent, and temperature. between 1946 to 2339K in the work function are reported. The fourth section includes the determination of effective work function. normal spectral emissivity. recrystallization temperature and microhardness of tungsten-rhenium and tungsten-rhenium-thoriated alloys. in the temperature range between 1400 to 2500K Section No. 5 summarizes the research on the influence of heating time. temperature and alloying content of rhenium in the work function of tungsten alloys as determined in the Vacuum Emission vehicle. Finally. in the last section. the mechanical properties of tungsten-30 percent rhenium were investigated by using an Instron tensile testing equipment with a high

AD-A173 245

AD-A173 246   20 12

STANFORD UNIV CA STANFORD ELECTRONICS LABS

(U) Instrumentation for Research on Ultra-Small GaAs Devices

DESCRIPTIVE NOTE   Final rept 16 Oct 85 15 Oct 86.

AUG 86   9P

PERSONAL AUTHORS. Harris,James S.;

CONTRACT NO.   N00014 83 K 0077, AFOSR-84-0253

PROJECT NO.   2917

TASK NO.   A3

MONITOR: AFOSR
            TR 86 0816

            UNCLASSIFIED REPORT

ABSTRACT: (U)   This grant. under the DoD University Research Instrumentation Program funded the purchase of processing equipment for GaAs structures and devices this processing facility is now completed and in operation.

DESCRIPTORS: (U) *GALLIUM ARSENIDES *PROCESSING EQUIPMENT. STRUCTURES. PROCUREMENT.FACILITIES. PROCESSING. INSTRUMENTATION. UNIVERSITIES

IDENTIFIERS   (U) WUAFOSR2917A3. PE61102F

AD-A173 246

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A173 245   CONTINUED   AD-A173 242   11/9   7/3

                                     ARIZONA UNIV TUCSON DEPT OF CHEMISTRY

                                     (U) Thermal Polymerization of Isomeric Dodecadiendiyndiols.

temperature, ultrahigh vacuum system. The relationship
between the normalized Young's modulus, ultimate tensile   AUG 86   21P
strength, yield strength, elongation and test temperature
was examined (Author).   PERSONAL AUTHORS: Maldar,N. N ;Burillo,S. G ;Ogawa,
                                                              Takeshi ;Marvel,C. S
DESCRIPTORS (U) *TUNGSTEN ALLOYS, *RHENIUM ALLOYS,
SINTERING EUTECTICS, ACTIVATION, MICROSCOPY, THERMIONIC   CONTRACT NO.   AFOSR-82-0007
EMISSION WORK FUNCTIONS, TEST METHODS, HIGH TEMPERATURE,
HIGH VACUUM SPACE SYSTEMS, ENERGY CONVERSION   PROJECT NO.   2303

IDENTIFIERS (U) Ultralloys, WUAFOSR2303B1 PEG1102F   TASK NO   B2

                                                              MONITOR: AFOSR
                                                                         TR-86 1017

                                                                        UNCLASSIFIED REPORT

ABSTRACT (U)   Recently the polymerization of acetylenic
compounds having two or more acetylene units, R-C triple
bond C-n R , has attracted much attention and numerous
reports have been published. In the case of diacetylenes,
n=2, the majority of studies are concerned with the
unique topochemical polyzerization in crystalline states.
However, little has been studied on the thermal behavior
of these polyacetylenic compounds, except for diphenyl
diacetylenes. although it is known that many of them
simply undergo polymerization on heating when n is
greater than four and R=H, the compounds become unstable
and in many cases it is difficult to prevent their
polymerization on standing. Jones and his coworkers have
synthesized many polyacetylenic compounds including those
occurring naturally in plants of Composite family. These
polyacetylenes contain four or five conjugated acetylenic
units linked to the terminal vinyl groups and are
reported to be dangerously unstable. Nakagawa has
prepared diphenyltetraacetylene. which is stable in the
dark Korshak et al. have claimed that a polyyne with a
structure H-C triple bond C(n-H. and stable up to 2300 C
was obtained by the oxidative degydropolycondensation of
acaetylene. Although the relationships between stability
and structure are not yet clear, all of these compounds
are interesting as potential heat resisting materials
with high carbon contents

DESCRIPTORS: (U)   *ACETYLENES, *POLYMERIZATION, LINKAGES.

AD-A173 242

AD-A173 245

AD-A173 242   CONTINUED

AD-A173 241   9/3

HARVARD UNIV CAMBRIDGE MA

(U) Geometric Problems in Adaptive Control.

CARBON, HEATING, VINYL PLASTICS, BIPHENYL, POLYMERS, HEAT
THERMAL PROPERTIES, HEAT TREATMENT, THERMAL STABILITY,
HEAT RESISTANT MATERIALS, ISOMERS

DESCRIPTIVE NOTE: Final rept. 1 Jan 81-30 Apr 85.

IDENTIFIERS   U   Dodecadiendiyndiols

APR 86   13P

PERSONAL AUTHORS: Brockett, R. W.;

CONTRACT NO   AFOSR-81-0054

PROJECT NO.   2304

TASK NO.   A6

MONITOR: AFOSR
           TR-86-0967

UNCLASSIFIED REPORT

ABSTRACT: (U) Adaptive control has become practical in
recent years because of the increased use of VLSI
technology in implementing feedback control. The work
described here has lead to the first proofs of
convergence for some adaptive algorithms for stabilizing
linear time invariant, but unknown, systems. It has also
clarified robustness issues associated with this class of
adaptive control algorithms. With the use of geometrical
methods it has been possible to establish the
impossibility of achieving several types of adaptive
behavior. New directions for expanding the field of
adaptive control have been explored. (Author)

DESCRIPTORS: (U)   *ADAPTIVE CONTROL SYSTEMS, APPLIED
MATHEMATICS, ALGORITHMS, GEOMETRY, LINEAR SYSTEMS,
FEEDBACK, CONVERGENCE, SYSTEMS ENGINEERING

IDENTIFIERS   (U)   ROBUSTNESS, WUAFOSR2304A6, PE61102F

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A173 240   13/13   AD-A173 239   13/13

OKLAHOMA UNIV NORMAN DEPT OF MATHEMATICS   NORTHWESTERN UNIV EVANSTON IL DEPT OF CIVIL ENGINEERING

(U) Estimation and Control of Distributed Models for   (U) Efficient Finite Element Methods for Transient
    Certain Elastic Systems Arising in Large Space   Analysis of Shells.
    Structures

DESCRIPTIVE NOTE: Annual rept. 1 Jul 84-1 Jul 85   DESCRIPTIVE NOTE: Final rept. Feb 81-Feb 84.

    JUL 85   10P   APR 85   85P

PERSONAL AUTHORS: White,Luther W   PERSONAL AUTHORS: Belytschko,Ted ;

CONTRACT NO: AFOSR 84-0271   CONTRACT NO: F49620-82-K-0013

PROJECT NO: 2304   PROJECT NO: 2302

TASK NO: A1   TASK NO: B1

MONITOR: AFOSR   MONITOR: AFOSR
    TR-86-0965   TR-86-1009

UNCLASSIFIED REPORT   UNCLASSIFIED REPORT

ABSTRACT: (U) During the reporting period progress was
made toward the goal of developing efficient and accurate
estimation and control algorithms for elastic structures
composed of beams and plates. Specifically, results were
obtained that determine necessary and sufficient
conditions for uniqueness in discrete versions of second
order elliptic estimation of elastic coefficients for
static and dynamic models of beams and plates, the
control of the shape of static beams and plates by means
of actuators of small support and the optimal placement
of actuators to control the shape of beams and plates.
These efforts have produced computer codes on which
experimentation is currently being conducted to test
methods and algorithms. (Author)

ABSTRACT: (U) Efficient and accurate elements for the
large displacement, transient analysis of shells have
been developed. The essential feature of these elements
is the use of minimal quadrature, which consists of 1
point quadrature in the 4-node quadrilateral or the 3-
node triangle, and 2x2 quadrature in the 9-node element.
Since these minimal quadrature elements possess spurious
singular modes, their use requires effective control of
these modes. A control procedure has been developed which
satisfies consistency and hence does not impair the
convergence of the element. This is achieved through a
special gamma-projection which is orthogonal to linear
fields; hence these elements are called gamma-elements.
In addition to these developments, the following was
achieved in this project: (1) the identification of the
membrane locking phenomenon which impedes the convergence
of any fully integrated curved element; (2) the
development of general methods for ameliorating membrane
locking through both explicit mode decomposition
projections and through implicit projections by means of
reduced integration; (3) the development of stabilization
procedures for higher order elements such as the 9-node
element which satisfy basic consistency and the patch
test. (Author)

DESCRIPTORS: (U) 'SPACE SYSTEMS; 'CONTROL THEORY;   DESCRIPTORS: (U) 'SHELLS;'STRUCTURAL FORMS; 'STRUCTURAL
FLEXIBLE STRUCTURES; ELASTIC PROPERTIES; BEAMS;'STRUCTURAL;
PLATES; MATHEMATICAL MODELS; CONTROL; ALGORITHMS

IDENTIFIERS: (U) 'Large space structures; WUAFOSR2304A1.
PE61102F

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AD-A173 239   CONTINUED

ANALYSIS: SHEAR PROPERTIES. NODES. MEMBRANES

IDENTIFIERS   (U)   Membrane locking Transient structural
analysis WUAFOSR2308281. PE61102F

AD-A173 239

AD-A173 237   1/4

UNITED TECHNOLOGIES RESEARCH CENTER EAST HARTFORD CT

(U)   Examination of Mechanisms and Fuel-Molecular Effects
on Soot Formation.

DESCRIPTIVE NOTE: Annual rept. 15 Nov 84-14 Nov 85.

DEC 85   32P

PERSONAL AUTHORS: Colket,Meredith B . , III ;Seery,Daniel
J .;Sanjiovanni,Joseph J .;

REPORT NO.   UTRC/R85-957047

CONTRACT NO.   F49620-85-C-0012

PROJECT NO.   2308

TASK NO.   A2

MONITOR: AFOSR
TR-86-1051

UNCLASSIFIED REPORT

ABSTRACT: (U)   Acetylene. vinlyacetylene. and benzene
have been pyrolyzed in a single-pulse shock tube over the
temperature range of 1000 to 2400K and for dwell times of
approximately 700 microseconds. Gas samples of reactant,
intermediate. and final products were collected and
analyzed using gas chromatography. Experimental data were
used in conjunction with a computer model to develop (or
confirm existing) detailed chemical kinetic models for
several of the hydrocarbons that were pyrolyzed. Model
results agreed well with experimental data not only for
the decomposition of the parent compound and formation
and decomposition of single-ring aromatic species. The
formation processes are believed to lead to the
production of polycyclic aromatic hydrocarbons. soot
precursors. and eventually soot.

DESCRIPTORS: (U)   *ACETYLENE. *SOOT. *BENZENE. *FUELS.
*PYROLYSIS. CHEMICAL REACTIONS. MODELS. REACTION KINETICS.
DECOMPOSITION. GASES. SAMPLING. AROMATIC HYDROCARBONS.
POLYCYCLIC COMPOUNDS. PRECURSORS. COMPUTERIZED SIMULATION.
GAS CHROMATOGRAPHY. HYDROCARBONS. PRODUCTION. TEMPERATURE

IDENTIFIERS: (U)   WUAFOSR2308A2. PE61102F

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A173 236   CONTINUED

VELOCITY. VARIABLE PRESSURE. LASER INDUCED FLUORESCENCE

IDENTIFIERS: (U) Reacting Flows. Turbulent Mixing. Flow
Structures. Unsteady Reaction Process. WUAFOSR2308A2.
PE61102F

AD-A173 236   21 2   20 4   7 4

STANFORD UNIV CA DEPT OF MECHANICAL ENGINEERING

(U) An Investigation of Flow Structure Mixing and
Chemical Reaction in Combusting Turbulent Flows

DESCRIPTIVE NOTE: Annual technical rept 1 Sep 84-31 Aug
85.

OCT 35   12P

PERSONAL AUTHORS: Bowman.Craig T. ;Cantwell.Brian J .

CONTRACT NO: AFOSR-84-0373

PROJECT NO: 2308

TASK NO: A2

MONITOR: AFOSR
TR 86 1054

UNCLASSIFIED REPORT

ABSTRACT: (U) An experimental investigation of the
relationship between flow structure and chemical reaction
structure in a combusting turbulent flow has been
initiated The objective is to study the spatial
structure of the unsteady reaction process as it relates
to the unsteady velocity field. The configuration chosen
for study is a co flowing non premixed jet flame. with
methane in the core flow and air in the surrounding flow.
Initial experiments show that unless suitable forcing
conditions a very periodic and controllable flow suitable
for conditional sampling can be produced. Preliminary
results from single component velocity measurements
indicate that when the jet is forced at a particular
frequency the flame breaks up into a periodic series of
flamelets and the flow acceleration and turbulence
intensity on the jet axis is substantially reduced
Significant progress has been made in teh development of
a planar laser induced fluorescence technique for radical
species visualization in the flame. Single shot images of
both CH and C2 fluorescence have been obtained in
hydrocarbon air flames

DESCRIPTORS: (U) COMBUSTION. JET FLAMES. TURBULENT
FLOW. STRUCTURAL PROPERTIES. CHEMICAL REACTIONS. MIXING
CHEMICAL RADICALS. METHANE. AIR FLOW. HYDROCARBONS.

AD A173 236

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AD-A173 232   20 5   AD A173 224   7/3

PRINCETON UNIV NJ PLAMA PHYSICS LAB   BRISTOL UNIV (ENGLAND) DEPT OF INORGANIC CHEMISTRY

(U) Population Inversion and Gain Measurements for Soft X-   (U) Cyclisation of Metal Chain Complexes: X-Ray Crystal
    Ray Laser Development in a Magnetically Confined   Structures of (Pt3W4(u-CR)2(u3-CR)2(CO)8(n-C5H5)4)
    Plasma Column   and (Pt4W4(u-CR)(u3-CR)3(CO)8(n-C5H5)4) (R = C6H4Me-4).

DESCRIPTIVE NOTE: Final progress rept   1 Nov 83-30 Sep 85.   86   5P

   SEP 85   40P   PERSONAL AUTHORS: Elliot,Gregory P. ;Howard,Judith A. ;
                                                                  Nunn,Christine M. ,Stone,F. G. ;
PERSONAL AUTHORS: Suckewer,Simon ;
                                                              CONTRACT NO   AFOSR-82-0070
CONTRACT NO   AFOSR-84 0025
                                                              PROJECT NO.   2303
PROJECT NO.   2301
                                                              TASK NO.   P2
TASK NO.   A8
                                                              MONITOR: AFOSR
MONITOR: AFOSR   TR-86-0972
            TR-86-0825
                                                                     UNCLASSIFIED REPORT
       UNCLASSIFIED REPORT

ABSTRACT: (U)   The following was accomplished in the x
ray laser experiments underway: 1) A new optical system
was built for the CO-2 laser which allowed an order of
magnitude higher power density in the focal plane. 2) The
time evolution of the laser pulse was improved. 3) Work
continued on the jet stream gas target. 4) A number of
carbon targets were developed and tested. 5) EUV axial
and transverse instruments were modified for measuring
line intensities as a function of time. 6) Modifications
were made to the computer simulation code and 7) Single
pass gains of between 2 8 and 3 5 were made for various
carbon targets

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Chemical Society,
Chemical Communications, p431-433 1986.

ABSTRACT: (U)   The pentanuclear metal complex (Pt3W2(mu
sub 3-CR)2(CO)4(cod)2(pi-C5H5)2) (R = C6H4Me-4, cod =
cyclo-octa-1,5-diene) reacts with (W(triple bond CR)(CO)
2(Eta-C5H5)) to give (Pt3W4(mu sub 3 -CR)2(mu sub 3 -CR)
2(CO)8(Eta -C5H5)4), and the latter with (Pt(C2H4)3),
prepared in situ from (Pt(cod)2), yields (Pt4W4(mu -CR)
(mu sub 3 -CR)3(CO)8(mu -C5H5)4) containing a Pt4W4 ring,
the structures of these metal cluster complexes have been
established by X-ray diffraction.

DESCRIPTORS: (U)   *CARBON DIOXIDE LASERS, *LASER TARGET   DESCRIPTORS: (U)   *METAL COMPLEXES, *PLATINUM, *TUNGSTEN,
INTERACTIONS, LASER COMPONENTS, FAR ULTRAVIOLET RADIATION,   *CYCLIC COMPOUNDS, MOLECULAR STRUCTURE, CHEMICAL
GAIN, X RAYS, COMPUTERIZED SIMULATION, PLASMAS/PHYSICS),   REACTIONS, ORGANOMETALLIC COMPOUNDS, DIENES, REPRINTS
X RAY SPECTRA, CARBON, FLUORINE, ALUMINUM, SILICON,
OXYGEN, NEON, RESEARCH MANAGEMENT   IDENTIFIERS: (U)   WUAFOSR2303B2, PE61102F

IDENTIFIERS: (U)   *X Ray Lasers, Laser Targets, Carbon
Targets, WUAFOSR2301AS, PE61102F

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO EVN54B

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MISSISSIPPI STATE UNIV MISSISSIPPI STATE DEPT OF
AEROSPACE ENGINEERING

(U) Numerical Grid Generation in Arbitrary Surfaces
     through a Second Order Differential Geometric Model.

MAY 86   16P

PERSONAL AUTHORS: Warsi Z U

CONTRACT NO   AFOSR-80-0185

PROJECT NO   2304

TASK NO   A2

MONITOR   AFOSR
                TR-86-1035

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in Jnl of Computational Physics.
/64 n1 p92 06 May 86

ABSTRACT   (U)   In this paper a set of second-order
partial differential equations for the generation of
coordinates in a given surface has been developed and
then solved numerically to demonstrate its potential for
surface coordinate generation. The proposed equations are
not some arbitrarily chosen equations but are a
consequence of the formulate of Gauss, and thus carry with
them an implicit dependence on the geometric properties
of the given surface. Furthermore these equations are
easy to solve and require only the specification of the
bounding curves to provide the Dirichlet boundary
conditions for their solution. Possible coordinate
generation both in simply and doubly connected regions on
some known surfaces, with the option of coordinate
redistribution have been presented. Extension of this
technique to arbitrary surfaces seems to be
straightforward.

DESCRIPTORS   (U)   GRIDS/COORDINATES NUMERICAL METHODS
AND PROCEDURES   PARTIAL DIFFERENTIAL EQUATIONS CARTESIAN
COORDINATES MATHEMATICAL MODELS REPRINTS

(.. . .   .. OEG11025
W-AFOSR72-0048

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AD-A173 216   20/11

SOUTHWEST RESEARCH INST SAN ANTONIO TX

(U) Nonlinear Fracture Mechanics Analysis with Boundary
     Integral Method.

DESCRIPTIVE NOTE: Final rept. 2 Apr 84-30 May 86.

MAY 86   101P

PERSONAL AUTHORS: Cruse,T. A. ;Polch,E. Z. ;

REPORT NO   SWRI-06-8044

CONTRACT NO   F49620-84-C-0042

PROJECT NO   2302

TASK NO   B2

MONITOR   AFOSR
                TR-86-0862

UNCLASSIFIED REPORT

ABSTRACT   (U)   The first goal of the originally proposed
program was to extend an existing planar elastic fracture
mechanics analysis based on the BIE methodology to the
analysis of plastic zones around cracks. The second
proposed goal was to establish fundamental results for
crack tip elastoplastic behavior, based on a numerical
and analytical study of the elastoplastic BIE formulation.
The third proposed goal was to establish the credibility
of the elastoplastic BIE formulation relative to the
finite element method for refined numerical analysis of
the nonlinear fracture mechanics problem, and to apply
the capability to important problems of fatigue crack
growth modeling for advanced aerospace structures. The
goal for the second year of the effort was to extend the
research to the problem of modeling crack extension under
elastoplastic conditions. This report summarizes key
findings of the current research effort. The next section
summarizes the basic two dimensional elastoplastic
formulation and applications. Included in this work are
the preliminary applications of the new method to crack
extension into prior plastic zones. The next section
reports on the use of the new BIE formulation for elastic
crack extension. This new result allows for the direct
computation of crack weight functions. The last section

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NORTHWESTERN UNIV EVANSTON IL DEPT OF CIVIL ENGINEERING

(U) Effective Finite Elements for Shell Analysis

DESCRIPTIVE NOTE: Final rept. 1 Feb 83-30 Jan 84.

reports on some recent work for the 3D BIE fracture mechanics formulation. Some contrast with the 2D formulation is noted. Further work on the 3D problem is expected in the subsequent research program.

FEB 84   87P

PERSONAL AUTHORS: Belytschko,T ;Stolarski,H ;Liu,W.K. ; Carpenter,N.

DESCRIPTORS: (U) *FRACTURE(MECHANICS), *CRACK PROPAGATION, AIRFRAMES, FATIGUE(MECHANICS), ELASTIC PROPERTIES, PLASTIC PROPERTIES, CRACKS, MATHEMATICAL MODELS

CONTRACT NO.   F49620-82-K-0013

PROJECT NO.   2302

TASK NO   B1

IDENTIFIERS: (U)   Crack Tips, Boundary integral equations, BIE(Boundary integral equations PE61102F, WUAFOSR2302B2

MONITOR: AFOSR TR-86-0891

UNCLASSIFIED REPORT

ABSTRACT: (U)   One of the major difficulties in the formulation of effective shell elements has been identified to be the phenomenon of membrane locking. Membrane locking occurs in curved shell elements when the in-plane displacement approximation is not of higher order than the transverse displacement approximation and inextensional bending of the shell cannot take place. Inextensional bending is an important mode of deformation, and when an element is not capable of representing inextensional bending, parasitic membrane energy is generated in many modes of deformation. In the same manner that parasitic shear causes shear locking, this spurious membrane energy causes membrane locking. Membrane locking severely reduces the rate of convergence of shell elements, particularly in deep shells and in situations where the bending of the shell is the dominant mode of deformation. In this report, two methods for eliminating membrane locking in curved shell elements are presented.

DESCRIPTORS: (U) *SHELLS(STRUCTURAL FORMS), *FINITE ELEMENT ANALYSIS, BENDING, DEFORMATION, MEMBRANES, LOCKING(ELECTRONICS), SPURIOUS EFFECTS

IDENTIFIERS: (U)   PE61102F, WUAFSOR2302B1

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AEROCHEM RESEARCH LABS INC PRINCETON NJ

(U) Ionic Mechanisms of Soot Formation in Flames

DESCRIPTIVE NOTE   Annual rept 15 Sep 83-14 Sep 84,

MAR 86   30P

PERSONAL AUTHORS   Calcote H F ; Olson Douglas B

REPORT NO   AEROCHEM TP 455

CONTRACT NO   F49620-83-C-0150

PROJECT NO   2308

TASK NO   A2

MONITOR   AFOSR
TR-86-1005

UNCLASSIFIED REPORT

DESCRIPTORS: (U) SOOT, FLAMES, IONS, THEORY,
COMBUSTION, TEMPERATURE, PROFILES, LOW PRESSURE,
ACETYLENE, OXYGEN, THERMOCOUPLES, MEASUREMENT, ION
DENSITY, DECAY, REACTION KINETICS, FUELS, MIXTURES,
LANGMUIR PROBES, SPECTROSCOPY

IDENTIFIERS: (U) Ion Molecule Interactions, PE61102F,
WUAFOSR2308A2

ABSTRACT   (U)   The ionic theory of incipient soot
formation has been further evaluated Accurate
temperature profiles through a series of low pressure, 2
7 kPa acetylene oxygen flames on either side of the
threshold soot index were measured using radiation loss
compensated electrically heated thermocouples With these
data and Langmuir probe curves determined in these same
flames the absolute ion concentrations were obtained
These were in excellent agreement with similar data
obtained by others using a molecular beam ion sampling
technique In two flames demonstrating that the ion
concentration peak precedes the appearance of soot, the
ion concentration is greater than the concentration of
soot particles and ions decay after soot appears
Characteristic times, that ion molecule reaction rates are
sufficiently to account for soot formation, they also
indicate the reactions which must be included in any
detailed computer model of the process of soot formation
The ultimate goal of this study Experimental temperature
measurements of the soot threshold of flames of varying
fuel oxygen rich mixtures produced the surprising
result that soot threshold through the variation of temperature
varied over a large range

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TENNESSEE UNIV. KNOXVILLE MEMORIAL RESEARCH CENTER AND HOSPITAL

(U) Fluorocarbon toxicant Action on a Membrane Channel. Effects of Formycin Derivatives, Cell Recovery and Detoxification.

The capacity for cell division recovered during two additional days of incubation at 37 C. Cell recovery from each of the three formycin derivatives was accelerated by a simultaneous treatment with dilazep. The cell recovery technique is suggested as potential procedure to demonstrate toxicant selectivity for different cell types.

DESCRIPTIVE NOTE: Final technical rept. 1 Aug 82-31 Jul 86.

SEP 86   20P

PERSONAL AUTHORS: Wigler Paul W.

CONTRACT NO: AFOSR 82-0261

PROJECT NO: 2312

TASK NO: A5

MONITOR: AFOSR
TR-86-0926

DESCRIPTORS: (U) *MEMBRANES(BIOLOGY), *TOXICOLOGY,
*LYMPHOMAS, DRUGS, FATTY ACIDS, AMINES, PURINES,
*FLUORINATED HYDROCARBONS, CELLS(BIOLOGY), CELL DIVISION,
BUFFERS, CONSTANTS, CONTROL, DETOXIFICATION, EMISSION,
EXTERNAL, FLOW, FLUORESCENCE, FLUORINATED HYDROCARBONS,
GROWTH(GENERAL), INHIBITION, NUCLEOSIDES, RECOVERY, TOXIC
AGENTS, TOXINS AND ANTITOXINS, URIC ACID, VALUE

IDENTIFIERS: (U) Formycin B, PE61102F, WUAFOSR2312A5

UNCLASSIFIED REPORT

ABSTRACT: (U) Treatment of L5178Y mouse lymphoma cells
with perfluoro n decanoic acid (PFDAS) at 30 C produced
inactivation of a channel in the cell membrane, activity
of the channel was estimated from the efflux of 2-
aminopurine (AP). The cells were preloaded with 100
micromoles AP, put in a flow system, and AP efflux was
estimated continuously at 21 C from the fluorescence
emission of AP at 370 nm. The initial rate of AP efflux
for control cells increased with AP was inhibited by the
presence of uric acid in the external buffer with an
apparent inhibition constant value of 355 micromoles for
urate. These observations indicate a urate-sensitive
channel for AP in the membrane of L5178Y cells. The AP
channel was markedly inactivated by 150 micrograms/ml
PFDA for 24 hr at 30 C. There was no significant recovery
of AP flux after 3 days at 30 C in fresh growth medium,
however, recovery was significant after 6 days. Recovery
of activity of the AP channel occurred in one day at 37 C.
Cell recovery studies were continued by experiments to
show the effect of the drug dilazep on the recovery of
L5178Y cells from treatment with three nucleoside toxins.
A one day treatment at 37 C with formycin A, formycin B,
or 5 deoxyformycin A produced an arrest in cell growth

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LEHIGH UNIV BETHLEHEM PA DEPT OF METALLURGY AND
MATERIALS ENGINEERING

(U) A Study of Fatigue Crack Propagation in Powder
     Metallurgy Hot Isostatically Pressed Nickel Base Alloy.

IDENTIFIERS (U) *Fatigue crack propagation, Nickel
alloy LC Astroloy, Hot isostatically pressed alloys

DESCRIPTIVE NOTE   Final rept. 1 Jan 82 30 Jun 86.

AUG 86   220

PERSONAL AUTHORS   Hertzberg Richard W

CONTRACT NO   AFOSR 82 0229

PROJECT NO   95

TASK NO   A1

MONITOR   AFOSR
           TR 86 0929

UNCLASSIFIED REPORT

ABSTRACT   (U) LC Astroloy contains a complex
distribution of rounded cuboidal gamma prime precipitates
0.1 micrometers edge dimension cooling gamma prime 0
01 micrometers dia and prior particle boundary particles
of MC ZrO2 Alpha Al2O3 and MgO, the majority of MC
carbides were not found in conjunction with ZrO2
particles no K ICC previously assumed With K sub th value
were found to vary with specimen geometry with lower
values being associated with more "symmetrical specimen
geometries with four point bend giving K sub th sub th
increased with increasing grain size in agreement with
previous findings. The present results are attributed
speci... reasons, which exist with respect to crack
closure measurements and their calculation of FCP rates,
closure values different marked. equations decreasing
threshold determinations even through fatigue crack growth
rates remained unchanged The introduction of an
artificial asperity in the wake of the crack tip in a
2021 aluminum alloy give rise to large measured values of
closure at high delta K's influence on the crack growth
rates approach closure had minimal little influence on
associated fatigue crack growth rates ... fatigue crack
growth rates

DESCRIPTORS   *ALLOYS   *CRACK PROPAGATION
*NICKEL METALS *FRACTURE MECHANICS *CRACKS FRACTURE

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PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF
MATERIALS SCIENCE AND ENGINEERING

(U) High Temperature Oxidation Studies on Alloys
   Containing Dispersed Phase Particles and Clarification
   of the Mechanism of Growth of SiO2

DESCRIPTIVE NOTE   Annual rept no 1   15 Aug 85 14 Aug 86

   AUG 86   58P

PERSONAL AUTHORS   Simkovich, G   ;

PROJECT NO   2305

TASK NO   A2

MONITOR   AFOSR
           TR 86 0836

              UNCLASSIFIED REPORT

DESCRIPTORS   (U)   *COBALT ALLOYS, *DISPERSIONS,
   *OXIDATION, *IRON ALLOYS, *NICKEL ALLOYS   ALLOYS
   CHROMIUM   PARTICLES   COMPOSITION(PROPERTY)   COMMERCIAL
   EQUIPMENT   DRY MATERIALS   OXYGEN   HIGH TEMPERATURE   IRON,
   KINETICS   SILICON   MICROSCOPY   TEMPERATURE   OXIDATION,
   TEST METHODS   RATES   MATRIX MATERIALS   NICKEL,
   THERMOGRAVIMETRIC ANALYSIS   SILICON DIOXIDE   PHASE
   STUDIES   SILICON NITRIDES   REACTION KINETICS   PARTIAL
   PRESSURE   SILICON CARBIDES

IDENTIFIERS   (U)   Dispersed phase particles   PE61102F,
   WUAFOSR2306A2

ABSTRACT   (U)   A relatively wide variety of oxidation
   tests were conducted on iron-based, cobalt-based and
   nickel-based alloys Basically, these tests were
   conducted on alloys with various concentrations of the
   alloying elements chromium and /or silicon in the iron
   matrix with variable additions of Si3N4 particles The
   Si3N4 particles dissolved to a major extent in the matrix
   material and also reacted with any oxygen present Thus,
   the final alloy composition was iron + various levels of
   chromium + silicon at a number of levels + particles of
   unreacted Si3N4 and SiO2 Kinetic studies were made at a
   number of temperatures at about 1 atm of dry oxygen It
   was found that the rates of oxidation were extremely slow
   and were comparable to many of the slowest growing
   commercial alloys Nickel and cobalt based alloys were
   also tested with additions of Si3N4 particles and were
   found to behave in a manner quite similar to that of the
   iron based alloys described above A small number of
   oxidation tests at 1000 C with P sub O2 approx 1 atm
   were also made with additions of SiAlON a high
   temperature compound found in the Si-Al-O-N system, to
   cobalt-chromium alloys The oxidation behavior of Ni-Cr-
   SiO2 alloys has also been investigated The final effort
   described in this report relates to the electrical short
   circuiting of SiO2 layers growing on Si or SiC or Si3N4)
   Keywords Thermogravimetric Analysis Microscopy

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVN54B

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STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY   ·STEARATES, ·MICROBALANCES, ·CRYSTAL OSCILLATORS, QUARTZ.
                                                          CRYSTALS, MASS, MEASURING INSTRUMENTS, SENSITIVITY, GOLD.
(U) Novel Application of the Quartz Crystal Microbalance   MOLECULAR STRUCTURE, REPRINTS
    to Study Langmuir Blodgett Films
                                                          IDENTIFIERS: (U) WUAFOSR2303B3, PE61102F
      86   4P

PERSONAL AUTHORS   McCaffrey, Robert R , Bruckenstein,
       Stanley ,Prasad,Paras N

REPORT NO   SUNY AB TR 1

CONTRACT NO   F49620 85 C 0052

PROJECT NO   2303

TASK NO   B3

MONITOR   AFOSR
              TR 86 0954

          UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in Langmuir , 2 n2 p228-229 1986.

ABSTRACT   (U)   An oscillating quartz crystal can be used
as a very sensitive mass measuring device because its
resonance frequency changes upon the deposition of a
given mass to the crystal surface. The application of
this phenomenon is widespread and has lead to terming
this use of a quartz crystal as the quartz crystal
microbalance. Sensitives on the order of 1 ng are readily
obtained, and the change in frequency is a linear
function of the mass attached to the surface of the
crystal. The sensitivity characteristics of the quartz
crystal microbalance make it ideally suited to study
fractional monolayer and multilayer films. Interest in
Langmuir Blodgett films is widespread and, for example,
one can form highly ordered ultrasubmicron thin films
with interesting electronic and optical properties. In
this paper we report our initial results applying the
quartz crystal microbalance technique to study calcium
stearate monolayer and successively deposited multilayer
Langmuir Blodgett films. The determination of the mass
deposited can provide useful information about molecular
orientation of such films.

DESCRIPTORS   (U)   ·THIN FILMS, ·CALCIUM COMPOUNDS,

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AD-A173 204   20 3   20 12

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NATIONAL BUREAU OF STANDARDS BOULDER CO ELECTROMAGNETIC
TECHNOLOGY DIV

calculation, was developed.

(U) Transient Losses in Superconductors

DESCRIPTORS (U) *SUPERCONDUCTORS, *ELECTRICAL IMPEDANCE,
*ALTERNATING CURRENT, ELECTROMAGNETIC SUSCEPTIBILITY,
HYSTERESIS, TRANSIENTS, LOSSES, MAGNETIZATION,
MAGNETOMETERS, NIOBIUM ALLOYS, TIN ALLOYS, TIN ALLOYS,
TITANIUM ALLOYS

DESCRIPTIVE NOTE   Final rept 1 Oct 82-30 Sep 85.

JUN 86   63P

IDENTIFIERS (U) Magnetic Susceptibility, Susceptometers,
Type 2 Superconductors, WUAFOSR2306C1, PE61102F

PERSONAL AUTHORS Goldfarb,R. B .

CONTRACT NO   AFOSR-ISSA-82-00047

PROJECT NO   2306

TASK NO   C1

MONITOR   AFOSR
TR-86-0872

UNCLASSIFIED REPORT

ABSTRACT (U) Under steady state conditions, there are
no losses in superconducting wires However, when
subjected alternating or transient magnetic fields or
transport currents, losses in type II superconductors can
become significant. This report deals with hysteresis
losses at 4K measured by magnetization and ships between
ac susceptibility The theoretical and experimental
relationships between ac susceptibility and magnetization
as functions of dc field were examined in terms of the
critical state model. Minor loop hysteresis loss was
shown to be obtainable by direct measurement of loop area,
from the imaginary component of ac susceptibility, and
from the reversible susceptibility plus the critical
current density or full-penetration field. Hysteresis and
transport losses measured simultaneously in a Nb-Ti
superconducting coil were found to agree substantially
with the predictions of Minervini's two dimensional model.
Hysteresis loss measurements in a series of fine filament
Nb3Sn superconductors showed that the effective filament
diameter is a function of interfilament separation and
local area ratio of matrix material to Nb. A review of
internal fields in superconductors showed the importance
of demagnetization factors and internal fields for the
correct analysis of magnetic data A theoretical method
of calibrating ac susceptometers for cylindrical
specimens, which is based on a mutual-inductance

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A173 200   7/4   20/8

OREGON UNIV EUGENE DEPT OF PHYSICS

(U) Krypton L-MM Auger Spectra: New Measurements and Analysis.

FEB 86   10P

PERSONAL AUTHORS: Levin,Jon C. ;Sorensen,Stacey L. ; Crasemann,Bernd ;Chen,Mau H. ;Brown,George S. ;

CONTRACT NO.   F49620-85-C-0040

PROJECT NO   2301

TASK NO   A4

MONITOR: AFOSR
          TR-86-0970

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   (U) Pub. in Physical Review A. v33 n2 p968-976 Feb 86.

ABSTRACT (U) Krypton L-MM Auger spectra have been measured with good resolution and statistics and have been compared with relativistic calculations in intermediate coupling with configuration interaction, ground-state correlation, and Coster Kronig fluctuation shifts are found to be significant. A previously reported anomaly in the L2-M2,3M4,5 spectra may be due to a phase error in earlier calculations.

DESCRIPTORS: (U) *AUGER ELECTRONS, *X RAY SPECTROSCOPY, *KRYPTON, *AUGER ELECTRON SPECTROSCOPY, ATOMIC SPECTRA, RELATIVITY THEORY, ELECTRON ENERGY, ELECTRON TRANSITIONS, REPRINTS

IDENTIFIERS: (U) Coster Kronig Transition Probabilities, Hartree Fock Slater Approximation, AB Initio Calculations, WUAFOSR2301A4 PE61102F

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NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC PROCESSES

(U) Extension of Three Theorems for Fourier Series on the Disc to the Torus.

JUN 86   21P

PERSONAL AUTHORS: Miamee,A. G. ;

REPORT NO.   TR-84

CONTRACT NO.   F49620-82-C-0009

PROJECT NO   2304

TASK NO.   A5

MONITOR: AFOSR
          TR-86-0999

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   (U) Pub. in Bulletin of the Australian Mathematical Soc ety. v33 n3 p335-350 Jun 86

ABSTRACT (U) Three well known facts of Fourier series on the disc are extended to Fourier series on the torus, a theorem of Szego, and the fact that any function in H1 can be factored as the product of two functions in H2. Here the role of negative integers is played by the lattice points in the third quadrant. In earlier extensions of these theorems this role was played by half planes.

DESCRIPTORS: (U) *FOURIER SERIES, *FUNCTIONAL ANALYSIS, TOROIDS, HILBERT SPACE, REPRINTS

IDENTIFIERS: (U) Noneuclidian Geometry, Stationary fields, Riesz theorem, szego theorem, WUAFOSR2304A5 PE61102F

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OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY

(U) Theoretical Studies of Vibrationally Assisted Reactions of the O3 NO van der Waals Complex.

of the NO vibrational mode is found to be much less effective in promoting reaction or vibrational predissociation on this potential energy surface.

APR 86   14P

DESCRIPTORS: (U) *EXCHANGE REACTIONS, *OZONE, *NITROGEN OXIDES, MOLECULAR VIBRATION, COVALENT BONDS, ENERGY TRANSFER, CHEMICAL DISSOCIATION PARTICLE COLLISIONS, REPRINTS

PERSONAL AUTHORS: Arnold Craig ;Gettys,Nancy S ;Thompson, Donald L ;Raff,Lionel M .

CONTRACT NO AFOSR-82-0311

IDENTIFIERS: (U) Van der waals forces, Internal energy. WUAFOSR2303A2, PE61102F

PROJECT NO 2303

TASK NO A2

MONITOR AFOSR TR 86 0974

UNCLASSIFIED REPORT

ABSTRACT: (U) The exchange reaction and dissociation dynamics of two O3 dot NO van der Waals complexes upon vibrational excitation has been determined at two different internal energies form the results of quasiclassical trajectories. The dynamics for such complexes is found to resemble that for chemical reactions occurring under matrix isolation conditions and to be significantly different from the O3 + NO bimolecular collision dynamics. Model specificity is found for reaction vibrational predissociation, and intermode energy transfer. Structure specificity is also observed for the van der Waals complexes. In most cases, the asymmetric stretching mode of O3 is found to be the most effective in promoting reaction. For predissociation and intermode energy transfer, the O bending mode is usually the most effective. A five-step mechanism consisting of two non-RRKM reactions, a non-RRKM energy transfer step, and two RRKM steps is required to explain the overall reaction. Excitation of the hindered rotational of NO about the O3 symmetry axis is found to significantly influence the dynamics in that partitioning of less than 2% of the energy into such motion dramatically increases the predissociation rate and, by inference the intermode energy transfer rate. Excitation

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

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TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) MNDO Calculations for the Dehydrocyclooctatetraenes.

85   7P

PERSONAL AUTHORS: Dewar,Michael J. ;Merz,Kenneth M. , Jr.

CONTRACT NO.   F49620-83C-0024

PROJECT NO.   2303

TASK NO   B2

MONITOR: AFOSR
           TR 86-1049

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl of the American Chemical
Society. v107 n22 p6175-6179 1985.

ABSTRACT: (U)   MNDO. UMNDO. and MNDO/CI calculations are
reported for the four didehydrocyclooctatetraenes and
bicycle valence tautomers. pentalene benzocyclobutadiene
and bicyclo 5.1.0 octatetraene. MNDO predicts that
bicyclo 5.1.0 octatetraene should be as stable as the
parent didehydrocyclooctatetraene. which is known to
exist. Two novel cyclic diallenes formed by conrotatory
or disrotatory ring opening of benzocyclobutene are also
predicted by MNDO to be stable species.

DESCRIPTORS. (U. 'CYCLIC COMPOUNDS. 'HYDROGEN COMPOUNDS.
'QUANTUM CHEMISTRY BENZENE COMPOUNDS. BUTADIENES.
BUTENES DIMERS COMPUTATIONS. REPRINTS

IDENTIFIERS   (U)   Octatetraenes (MDO)Modified Neglect of
Differential Overlap). Tautomers Pentalene
WUAFOSR2303B2. PE61102F

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AD-A173 196   7/3

SAN DIEGO STATE UNIV CA DEPT OF CHEMISTRY

(U) Gas-Phase Dyotropic Rearrangement of (Chloromethyl)
dimethylsilane.

86   5P

PERSONAL AUTHORS: Martin,J. G. ;Ring,M. A. ;O'Neal,H. E. ;

CONTRACT NO.   AFOSR-83-0209

PROJECT NO.   2303

TASK NO.   B2

MONITOR: AFOSR
           TR-86-1065

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Organometallics. v5 n6 p1228-
1230 1986.

ABSTRACT: (U)   Studies of the gas phase isomerization of
chloromethyldimethylsilane (I) to trimethylchlorosilane
(II) in a static reactor (635-690 K) are reported. The
neat reaction is shown to occur by two parallel reaction
pathways. a concerted dyotropic rearrangement and a free-
radical chain. The free radical chain pathway, which
appears to be wall initiated. has rate parameters. log k
sub chain - 9 42-43,000 cal/2 3RT. The dyotropic
rearrangement pathway. isolated by maximal chain
quenching with excess propylene. has rate parameters. log
k sub I = 12 99 + or - 13-52.165 + or - 405 cal/2.303RT.
An activation energy of 11 kcal for the 1,2-Cl shift
reaction ClCH2SiMe2 yields CH2SiMe2Cl. relative to the
chlorine abstraction reaction ClCH2SiMe2 + ClCH2SiHMe2
yields ClCH2SiMe2Cl + CH2SiHMe2 is deduced.

DESCRIPTORS: (U)   'SILANES. 'METHYL RADICALS. 'CHLORINE.
'ISOMERIZATION. VAPOR PHASES. MOLECULAR STRUCTURE. FREE
RADICALS. REACTION KINETICS. QUENCHING. ACTIVATION ENERGY.
REPRINTS

IDENTIFIERS   (U)   WUAFOSR2303B2. PE61102F

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Record 1

AD A173 192   14 2   20 6

SPECTRON DEVELOPMENT LABS INC COSTA MESA CA

(U) Optical Technique for the Measurement of High Temperature Material Erosion

DESCRIPTIVE NOTE: Annual rept 1 Mar-31 Mar 85.

APR 86   48P

PERSONAL AUTHORS: Arunkumar,K. D. ;Azzazy,M. ;Trolinger,J. D.

REPORT NO: SDL-86-2439-03

CONTRACT NO: F49620-85-C-0046

PROJECT NO: 2308

TASK NO: A3

MONITOR: AFOSR TR-86-1053

UNCLASSIFIED REPORT

ABSTRACT: (U) A differential Michelson's interferometer capable of measuring path length variation of the order of 0.002 microns has been developed and tested. It has also been proven that this interferometer can be used to measure surface heights on diffuse object. This ability of the interferometer will be used in profiling surfaces eroded electrically. To generate electrically eroded surfaces, a discharge chamber has been built and tested. Using copper electrodes, glow discharge has been struck and characterized. Work done on an eroded electrode with holographic interferometry shows that overall surface erosion of approximately lambda can be detected using this technique.

DESCRIPTORS: (U) *MICHELSON INTERFEROMETERS, *HIGH RESOLUTION, SURFACE ROUGHNESS, EROSION, HEIGHT, HOLOGRAPHY, INTERFEROMETRY, ELECTRODES, GLOW DISCHARGES, COPPER, PROFILES

IDENTIFIERS: (U) PE61102F, WUAFOSR2308A3

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PAGE   5G   EVN54B

UNCLASSIFIED

Record 2

AD A173 194

MASSACHUSETTS UNIV AMHERST DEPT OF ZOOLOGY

(U) Computer Assisted Microscope for Adaptive Network Research

DESCRIPTIVE NOTE: Final rept 1 Jun 85-31 May 86.

JUL 86   5P

PERSONAL AUTHORS: Moore, John W.

CONTRACT NO: AFOSR 85-0079

PROJECT NO: 2312

TASK NO: A1

MONITOR: AFOSR TR-85-0827

UNCLASSIFIED REPORT

ABSTRACT: (U) A computer-assisted light microscope (Leitz MPV-DADS) was purchased with funds provided by this DoD Instrumentation Grant. The system is capable of photometric image scanning of autoradiographic material and very low power dark field and fluorescent photomicroscopy. These capabilities are essential for neuroanatomical research being conducted in two laboratories at this institution.

DESCRIPTORS: (U) *COMPUTER APPLICATIONS, *MICROSCOPES, IMAGES, ADAPTIVE SYSTEMS, AUTORADIOGRAPHY, DARKNESS, IMAGES, LABORATORIES, LOW POWER, MATERIALS, NETWORKS, PHOTOMETRY, SCANNING

IDENTIFIERS: (U) Fluorescent Photomicroscopy, Neuroanatomy

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A173 187   20/11

UNITED TECHNOLOGIES RESEARCH CENTER EAST HARTFORD CT

(U) Plastic Strain Localization in Superalloy Single Crystals.

DESCRIPTIVE NOTE: Final rept. Mar 83-Jun 86.

JUL 86   102P

PERSONAL AUTHORS: Anton,D. L.; Giamei,A. F.;

REPORT NO. UTRC/R86-916534-3

CONTRACT NO. F49620-83-C-0104

PROJECT NO. 2306

TASK NO. A1

MONITOR: AFOSR
TR-86-0821

UNCLASSIFIED REPORT

ABSTRACT: (U) Nickel-base superalloys are notorious for their inhomogeneous deformation and poor fatigue behavior. Previous studies that the slip was planar or equivalently, coarse, independent of alloy composition. In this research, single crystal nickel alloys of various gamma prime volume fraction and misfit were deformed under either monotonic or cyclic loading conditions are examined for slip distribution at very high magnification. The conclusion of this research was that the degree of slip localization in superalloys is decreased moderately by misfit and significantly by larger volume fractions of the strengthening gamma prime phase. This difference in behavior is reflected in the location of initiation sites. The alloys with more localized slip showed surface initiation. Attempts to understand the origin of such pores by changes in solidification or heat treatment parameters led to the conclusions that it was possible to influence pore size or the volume fraction porosity, but that some pores were always present. As a result, no enhancement of fatigue life was obtained, consistent with theory.

DESCRIPTORS: (U) *SUPERALLOYS, *STRAIN(MECHANICS), *PLASTIC DEFORMATION, FATIGUE LIFE, SINGLE CRYSTALS.

AD-A173 187

AD-A173 183   14/2   17/1   20/13

STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

(U) Cryogenic Acoustic Microscopy.

DESCRIPTIVE NOTE: Annual technical rept. 1 Apr 85-31 Mar 86.

JUL 86   35P

PERSONAL AUTHORS: Quate C. F.;

REPORT NO. GL-4068

CONTRACT NO. AFOSR 85-0168

PROJECT NO. 2306

TASK NO. A2

MONITOR: AFOSR
TR 85-0832

UNCLASSIFIED REPORT

ABSTRACT: (U) The progress on the ultra-high resolution acoustic microscope is described. Two main areas are investigated. The mechanical scanner. The signal to noise ratio SNR is improved by developing higher efficiency acoustic transducers for broadband detection of sound. In the effects of pressure in liquid helium on the propagation of high intensity sound waves in superfluid helium are described. The possibility of utilizing parametric amplification. Sound in liquid helium to improve the SNR is reported. The design and development of a new scanner which will have a wider scanning range with great resolution operating in pressurized liquid helium are also described.

DESCRIPTORS: (U) *ACOUSTIC MICROSCOPES, SUPERFLUIDITY, LIQUID HELIUM, ELECTRONIC SCANNERS, ACOUSTIC WAVES, SIGNAL TO NOISE RATIO, BOLOMETERS, ACOUSTIC DETECTORS, ZINC OXIDES, GALLIUM ARSENIDES.

IDENTIFIERS: (U) Superconducting Bolometers, PE61102F, WUAFOSR2306A2.

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AD-A173 185   20 3   11 3

BATTELLE PACIFIC NORTHWEST LAB RICHLAND WI

(U) Electrical and Thermal Transport Property Studies of
    High Temperature Thermoelectric Materials

DESCRIPTIVE NOTE   Final rept   15 May 83-14 May 86.

JUN 86   54P

PERSONAL AUTHORS   Weber W J ,B tes,J L ;Griffin,C W
    ;Olsen L C ;

CONTRACT NO   F49620-83-C-0109

PROJECT NO   2308

TASK NO   K1

MONITOR   AFOSR
            TR 86-0822

UNCLASSIFIED REPORT

ABSTRACT   (U)   High-temperature electrical conductivity,
Seebeck coefficient, and thermal conductivity
measurements were used to investigate the thermoelectric
properties of several refractory oxide systems.
Particular emphasis was placed on an investigation of
lanthanum chromite and yttrium chromite as systems for
testing proposed transport models   The substitution of
divalent metal ions for La and Y results in the formation
of small polarons as charge carriers   Experimentally,
results show that the most effective divalent substitutes
for La and Y are Sr and Ca, respectively, due to similar
ionic size   Both electrical conductivity and Seebeck
coefficient exhibit behavior consistent with thermally-
activated transport by small polaron hopping   The
additional substitution of Mn for Cr or S for Q decreased
both electrical conductivity and Seebeck coefficient The
thermal conductivity generally decreased with temperature
and dopant concentration The dimensionless figure of
merit for these oxides approached 0.2 at high
temperatures.

DESCRIPTORS   (U)   *TRANSPORT PROPERTIES, *REFRACTORY
MATERIALS, *THERMOELECTRICITY, CHARGE CARRIERS,
COEFFICIENTS, ELECTRICAL CONDUCTIVITY, ELECTRICAL
PROPERTIES, FIGURE OF MERIT, HIGH TEMPERATURE, IONS.

AD-A173 183

STRAIN RATE PLANAR STRUCTURES CYCLIC TESTS GROWTH
GENERAL COMPRESSION POROSITY FATIGUE TESTS MECHANICS
CRACKING FRACTURING NICKEL ALLOYS

IDENTIFIERS   U   PE611021 WUAFOSR2305A1

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A173 185   CONTINUED

MEASUREMENT. METALS. MODELS. OXIDES. SEEBECK EFFECT.
THERMAL CONDUCTIVITY. THERMAL PROPERTIES. THERMAL
RADIATION. VALENCE

IDENTIFIERS: (U) *Thermoelectric Materials. Lanthanum
Chromite, Yttrium Chromite. Polarons. PE61102F.
WUAFOSR2308A1

AD-A173 186

AD-A173 183   20/5   20/10   9/4   17/7

NEW MEXICO UNIV. ALBUQUERQUE NM CENTER FOR ADVANCED
STUDIES

(U) The Correlated Emission Laser - Towards High
Sensitivity Ring Laser Gyroscopes and Wave Detectors.

DESCRIPTIVE NOTE: Final rept. 1 Mar 85-31 May 86.

SEP 86   114P

PERSONAL AUTHORS: Scully,M. O. ;Pedrotti,L. M. ;

CONTRACT NO.   AFOSR-85-0109

PROJECT NO.   2301

TASK NO.   A8

MONITOR: AFOSR
TR-86-0899

UNCLASSIFIED REPORT

ABSTRACT: (U)   In addition to this fundamental research
in the nature of the noise present in a measurement of
phase, and the consequent development of the CEL concept,
we have carried out research in a number of related
topics. This includes acting as a theoretical support
group for (now defunct) large passive resonant ring
gyroscope experimental effort which was carried out at F.
J. Seiler laboratories at the Air Force Academy. In
addition, a preliminary experimental RLG effort has begun
at the University of New Mexico under the auspices of
this contract. Finally, we studied in a somewhat general
manner the quantum distribution functions. Techniques
involved in this latter study are very useful in
calculations of quantum noise. (Author)

DESCRIPTORS: (U)   *RING LASERS. *PHASE MEASUREMENT.
*DETECTORS. *NOISE. *RADIATION MEASURING INSTRUMENTS.
*QUANTUM THEORY. *RADIATION MEASURING INSTRUMENTS. LASER
CAVITIES. GRAVITATIONAL FIELDS. HETERODYNING. GRAVITY
WAVES. MICROWAVES. POLARIZATION. SENSITIVITY. RADIATION.
PHASE SHIFT. GROUND LEVEL. SPACEBORNE. QUENCHING.
SPONTANEOUS COMBUSTION. THEORY

IDENTIFIERS: (U)   CEL (Correlated Emission Lasers),
Passive Detectors. GWD (Gravity Wave Detectors).

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AD-A173 182

UTAH UNIV SALT LAKE CITY DEPT OF CIVIL ENGINEERING

(U) Properties of Compacted Backfill Split Hopkinson
Pressure Bar

DESCRIPTIVE NOTE: Final rept 1 Nov 82-28 Feb 85

DEC 85   267P

PERSONAL AUTHORS: Olsen,Joseph M. ;Felice,Conrad W. ;

CONTRACT NO.   AFOSR-83-0014

PROJECT NO   2303

TASK NO.   B2

MONITOR: AFOSR
          TR-86 0826

ABSTRACT: (U) Loading on buried structures subjected to
nuclear or conventional high explosive weapons is
strongly influenced by the backfill adjacent to and
overlying the structure. The relative stiffness of the
structure and the surrounding soil and their interactions
will determine the level and extent of damage due to
blast loads. While soil response may be in the laboratory,
this environment must be able to reflect the type of
confinements, magnitude of stress change, and the time
scale of loading expected in the problem. The split
Hopkinson pressure bar (SHPB) technique has been adapted
to measure the dynamic response of soil to impulsive loads.
This technique can significantly extend the range of
stresses and strain rates that can be applied beyond the
capabilities of conventional laboratory dynamic soil
testing equipment. Various assumptions and considerations
involve in designing an SHPB experiment and evaluating
the data with soil as a specimen are discussed in detail.
Soils have low wave speeds, nonlinear hysteretic behavior,
and low unconfined compressive strength which complicate
SHPB testing. Insight is provided as to how these factors
affect experimental accuracy and data reliability. The
dynamic soil stress-strain response was found to be
governed principally by the initial gas porosity of the
specimen. Examples of stress-strain curves are present
for specimens with applied stresses and strain rates up

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO EVN548

AD-A173 182   CONTINUED   AD-A173 181   20/:0   7:4

to 520 MPa and 4000 s respectively.   TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

DESCRIPTORS   U   *BACKFILLS *SOIL DYNAMICS IMPULSE   (U) MNDO Calculations for Compounds Containing Mercury.
LOADING DYNAMIC TESTS *DYNAMIC LOADS COMPACTING.
DYNAMIC RESPONSE LABORATORY TESTS SOIL TESTS STRAIN   85   4P
RATE STRESSES RATES COMPRESSIVE PROPERTIES STRESS
STRAIN RELATIONS SAND POROSITY PORE PRESSURE   PERSONAL AUTHORS   Dewar,Michael J. ;Grady,Gilbert L. ;
                                                         Merz,Kenneth M   Jr ;Stewart,James J
IDENTIFIERS   U   SHPB Split Hopkinson Pressure Bar(s)
Porewater Pressure PE61102F WUAFOSR2303B2   CONTRACT NO   F49620-83-C-0024

                                                         PROJECT NO   2303

                                                         TASK NO   B2

                                                         MONITOR   AFOSR
                                                                    TR-86-1056

                                                               UNCLASSIFIED REPORT

ABSTRACT   (U) The MNDO method is now established as a
practical procedure for studying chemical behavior giving
results comparable with those from quite good ab initio
models (e.g. 4-31G) while requiring only one-thousandth
as much computer time. MNDO has been parametrized for
mercury Calculations are reported for a number of
compounds of mercury The results are comparable with
those for other metals.

DESCRIPTORS   (U) *QUANTUM CHEMISTRY *MERCURY COMPOUNDS.
HEAT OF FORMATION IONIZATION POTENTIALS DIPOLE MOMENTS.
MATHEMATICAL MODELS CHEMICAL PROPERTIES MERCURY.
COMPUTERS TIME METALS REPRINTS

IDENTIFIERS   (U) MNDO:Modified Neglect of Differential
Overlap WUAFOSR2303B2 PE61102F

AD A1 3 178   9 ?

MINNESOTA UNIV ST PAUL INST FOR MATHEMATICS AND ITS
APPLICATIONS

(U) Scientific Computation and Mathematical Modelling

DESCRIPTIVE NOTE   Final technical rept 11 Jan 85-10 Jan
86.

FEB 86   9P

PERSONAL AUTHORS   Miller,Willard , Jr.;Sell,George R.
Weinberger,Hans F.

REPORT NO   U OF M 0634-5139

CONTRACT NO.   AFOSR-85-0116

PROJECT NO.   2304

TASK NO.   A1

MONITOR   AFOSR
           TR 86-0966

UNCLASSIFIED REPORT

ABSTRACT (U) This is the final technical report for an
equipment grant which provided microcomputers in
individual offices to be used as research tool, by
faculty in the School of Mathematics and participants in
the programs of the Institute for Mathematics and Its
Applications. Many research projects are underway, also
mathematical software is being developed for use in the
Dynamical Systems, Stochastic Modeling and Combinatorics
Laboratories. The microcomputers will soon be linked by
an Ethernet and are serving as terminals for access to
the University's CRAY 2 supercomputer.

DESCRIPTORS (U)   *COMPUTER COMMUNICATIONS,
*CONFIGURATIONS. MATHEMATICAL MODELS, MICROCOMPUTERS,
COMPUTATIONS, MATHEMATICAL PROGRAMMING, SUPERCOMPUTERS,
ACCESS

IDENTIFIERS   (U)   CRAY 2 supercomputers, WUAFOSR23C4A1,
PE61102F

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AD A1   (U)   TASK OF PROGRAM NO

MASSACHUSETTS INST OF TECH CAMBRIDGE

(U) Studies of the Auroral Zone Ionosphere using the
Mithras Data Base: Flight Years 1983-1985

DESCRIPTIVE NOTE   Final rept Oct 82-Oct 85

JUN 86   21p

CONTRACT NO.   AFOSR-83-0002

MONITOR   AFOSR
           TR 86-1062

UNCLASSIFIED REPORT

ABSTRACT (U) The Autospheric Science group participated
in the multi-radar MITHRAS experimental campaign.
Coordinated observations of the Earth's ionosphere,
magnetosphere and thermosphere were conducted using the
Millstone Hill, Massachusetts, Chatanika, Alaska, and
European EISCAT incoherent scatter radars in conjunction
with a variety of ground based and satellite experiments.
Chatanika and EISCAT are about 11 hours apart in magnetic
local time, and Millstone Hill precedes Chatanika and
follows EISCAT by more than 6 hours. Each of the three
radars was able to study auroral zone latitudes, but at
widely spaced longitudes. Hence the MITHRAS program was
well suited to study the class of problems which involve
universal time, local time ambiguities, or equivalently,
space-time differences. Set operating modes were used at
the radar sites to best match the requirements of the
several campaign objectives. The overall MITHRAS program
was motivated by a desire to provide a well documented
set of radar observations of the mid and high latitude
ionosphere during the brief interval when three
incoherent scatter facilities would be available. At
Millstone Hill the MITHRAS program involved the
development of specific radar operating modes, and
analysis techniques appropriate for multi-instrument
studies. An extensive data set resulted from the campaign.

DESCRIPTORS   (U)   *AURORAE, *RADAR REFLECTIONS,
IONOSPHERIC DISTURBANCES, SOLAR CYCLE, MAGNETIC STORMS, F
REGION, DATA BASES, ELECTRON DENSITY, DIURNAL VARIATIONS,
CONVECTION, TRANSPORT PROPERTIES, RESEARCH MANAGEMENT

IDENTIFIERS   (U)   Mithras Data Base

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DTIC REPORT BIBLIOGRAPHY

Entry 1

AD-A173 114   6 16   5 10

TENNESSEE UNIV. MEMPHIS DEPT OF ANATOMY AND NEUROBIOLOGY

(U) Changes in Sensory Responsiveness in Behaving Primates

DESCRIPTIVE NOTE: Annual technical rept. Jul 85 Jul 86.

JUL 86   14P

PERSONAL AUTHORS: Nelson Randall J

CONTR NO   AFOSR 85 0217

PROJECT NO 2312

TASK NO   A2

MONITOR   AFOSR
           TR 85 0835

ABSTRACT (U) The three main goals of our research this
year have been 1 to establish a functional behavioral
and neurophysiological recording laboratory 2
to train monkeys to perform controlled wrist
movements to visual and vibratory go cues,
and 3 to begin recording from the sensorimotor cortices
...

DESCRIPTORS: (U) NEUROPHYSIOLOGY BEHAVIOR
PRIMATES. LABORATORY
ANIMALS MOTION REACTION TIME.
VISUAL STIMULI MOTOR NEURONS
INFORMATION PROCESSING VIBRATION SIGNAL PROCESSING

AD-A173 114

Entry 2

AD-A173 170   6 16

CITY OF HOPE RESEARCH INST DURATE CA

(U) Long-Term Synaptic Plasticity and Learning in Neuronal
Networks

DESCRIPTIVE NOTE: Final rept. 1 Jun 83 31 May 86.

JUL 86   14P

PERSONAL AUTHORS: Brown Thomas H

CONTRACT NO   F49620-83-C-0121

PROJECT NO   2312

TASK NO   A1

MONITOR: AFOSR
            TR 86 0835

ABSTRACT (U) The purpose of this project was to
understand the mechanisms by which use dependent changes
in synaptic transmission can encode information into
neural networks. Our working hypothesis that guided this
effort was that long-term synaptic potentiation (LTP) is
an excellent candidate mechanism for information storage
in the nervous system. The project was organized around
three interrelated efforts. First, new experimental and
theoretical techniques for analyzing synaptic function
were developed. Second, these and conventional methods
were used to understand the biophysical and molecular
mechanisms responsible for LTP in several different
tissues. Third, the relationship between LTP and several
forms of information encoding schemes was demonstrated.
These included synaptic analogs to classical conditioning,
Hebb's postulate, and a modified version of Klopf's
postulate. The results add confidence to our working
hypothesis, they provide new insights into our
understanding of synaptic plasticity, and they will
enable the definitive tests of some leading theories.

DESCRIPTORS: (U) NEUROCHEMICAL TRANSMISSION SYNAPSE
HIPPOCAMPUS NERVE CELLS POTENTIAL THEORY INFORMATION
SYSTEMS NERVOUS SYSTEM NEUROPHYSIOLOGY LEARNING.
MEMORY PSYCHOLOGY PLASTIC PROPERTIES

AD-A173 170

(U) Vibrational Participation in Chemical Reactions

DESCRIPTIVE NOTE: Final rept. 1 Nov 81-31 Oct 85.

AUG 86   11P

PERSONAL AUTHORS: Pimentel, George C.

CONTRACT NO.   AFOSR-82-0031

PROJECT NO.   2303

TASK NO.   B1

MONITOR: AFOSR
            TR-86-0824

UNCLASSIFIED REPORT

ABSTRACT: (U)   Evidence for mode-selective excitation of bimolecular reactions has been obtained in our laboratories under AFOSR support. Many laboratories have endeavored to demonstrate mode selective excitation of either unimolecular reactions since tunable lasers have come into the hands of chemists. Success can be attributed to use of the solid inert gas environment at cryogenic temperature (12K) and investigation of bimolecular reactions that can be excited with photons of sufficiently low energy that the reactant energy level diagram is still sparse. A significant, perhaps crucial, part of this technique is that rotational degrees of freedom are frozen out. Our first system selected for study was the NO + O3 reaction. The fluorine olefin reactions, F2 + ethylene and F2 + allene, provided our real successes. These reactions showed, first, that the reactions can be stimulated with tuned laser excitation of the olefin and, second, that the quantum yield is very strongly dependent on the energy of the exciting photon. HF Rotational Lasers. One of the significant and least understood aspects of the performance of the HF chemical laser has been the role of rotational degrees of freedom in vibrational relaxation. Nanosecond Infrared Spectroscopy

DESCRIPTORS: (U)   •REACTION KINETICS, •MOLECULE MOLECULE INTERACTIONS, •MOLECULAR VIBRATION, •PHOTOCHEMICAL

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AD-A173 16,   7, 4   14/2

MASSACHUSETTS UNIV AMHERST DEPT OF POLYMER SCIENCE AND
ENGINEERING

(U) Research Equipment. DoD URIP.

DESCRIPTIVE NOTE: Final rept. 15 Sep 84-14 Sep 85.

AUG 86   11P

REACTIONS, LASER APPLICATIONS, FLUORINE, OLEFIN POLYMERS,
COLLISIONS, CHEMICAL LASERS, CHEMICAL REACTIONS,
CRYOGENICS, DEGREES OF FREEDOM, DIAGRAMS, ENERGY, ENERGY
LEVELS, ENVIRONMENTS, GASES, HYDROGEN FLUORIDE LASERS,
INERT MATERIALS, INFRARED SPECTROSCOPY, LOW ENERGY,
MOLECULES, PHOTONS, QUANTUM THEORY, REACTANTS CHEMISTRY,
RELAXATION, ROTATION, SOLIDS, TEMPERATURE, TUNABLE LASERS,
VIBRATION, YIELD

PERSONAL AUTHORS: Karasz Frank E

CONTRACT NO.   AFOSR-84-0307

PROJECT NO   2917

IDENTIFIERS: U   WUAFOSR2303B1, PE61102F

TASK NO   A2

MONITOR   AFOSR
TR-86-C922

UNCLASSIFIED REPORT

ABSTRACT   (U)   The grant provided substantial funding for
a state-of-the-art transmission electron microscope and
for a variety of spectrometric equipment and ancillary
facilities. Both areas of instrumentation are heavily
used by DoD related and other polymer science researchers
and both provide the most versatile and sophisticated
instrumentation available

DESCRIPTORS   (U)   POLYMERS, INSTRUMENTATION,
SPECTROMETERS, ELECTRON MICROSCOPES, UNIVERSITIES

IDENTIFIERS   (U)   Transmission electron microscopes, URIP,
PE61102F, WUAFOSR2917A2

AD-A173 157   6.20   6.15   6.3   6.

COLORADO UNIV AT BOULDER INST OF BEHAVIORAL GENETICS

(U) Organophosphates: Genetics, Receptors and Antidotes.

DESCRIPTIVE NOTE   Final progress rept 15 Sep 82-14 Sep 85.

AUG 86   33P

PERSONAL AUTHORS: Collins, Allan C.

CONTRACT NO: AFOSR-82-0300

PROJECT NO: 2312

TASK NO: A3

MONITOR: AFOSR
TR-86-0945

UNCLASSIFIED REPORT

ABSTRACT: (U) Inbred mouse strains were found to differ in sensitivity to a number of behavioral and physiological effects elicited by DFP as well as in lethality. These differences were not easily explained in terms of differential inhibitors of acetylcholinesterase (AChE). Nicotine induced seizures were studied as a model system for organophosphate induced seizures. Nicotine induced seizures seem to be regulated, in the mouse, by a limited (perhaps one) number of genes and these genes also seem to regulate the number of hippocampal nicotinic receptors. Acute studies with DFP indicated that brain AChE activity does not return to control levels in adult male mice but control levels are regained in reaggregate brain cultures and in DFP treated mouse pups. Similarly, QNB binding did not return to control in striatum of DFP treated mice. This plus the absence of tolerance development suggests that DFP may cause irreversible damage to mouse brain.

DESCRIPTORS: (U) *ORGANIC PHOSPHORUS COMPOUNDS,
*CHOLINESTERASE INHIBITORS, *CHEMORECEPTORS, *GENETICS,
*ANTIDOTES, TOXICITY, PROPYL RADICALS, FLUORINE, NICOTINE,
CONVULSIVE DISORDERS, MODELS, GENES, CONTROL, HIPPOCAMPUS,
ACETYLCHOLINESTERASE, BRAIN DAMAGE, CHOLINERGIC NERVES,
MICE, REPRINTS

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ILLINOIS UNIV AT URBANA ENGINEERING RESEARCH CENTER FOR
COMPOUND SEMICONDUCTOR MICROELECTRONICS

(U) Amorphous Properties of Gallium Arsenide.

DESCRIPTIVE NOTE   Annual technical rept 1 Feb 85-31 Jan 86.

JUL 86

PERSONAL AUTHORS: Stillman, Gregory E.

CONTRACT NO: AFOSR 83-0030

PROJECT NO:

TASK NO: B1

MONITOR: AFOSR
TR-86-

UNCLASSIFIED REPORT

ABSTRACT: (U) Low temperature photoluminescence spectroscopy has been applied to the study of high purity GaAs grown by liquid phase epitaxial hydride vapor phase epitaxial rate growing chemical vapor deposition and molecular beam epitaxial growth techniques. This low temperature photoluminescence has been used in combination with the variable temperature Hall effect data to quantitatively determine the acceptor species present in high purity epitaxial GaAs. The incorporation of the amphoteric column IV elements has been studied for different growth conditions in each of the epitaxial growth techniques.

DESCRIPTORS: (U) *GALLIUM ARSENIDES, *EPITAXIAL GROWTH,
*AMPLIFIERS, SEMICONDUCTORS, AMPHO...IC,
PHOTOLUMINESCENCE, SPECTROSCOPY, LIQUID PHASES, VAPOR
PHASES, ...ATION, HALL EFFECT, DOPING, INDIUM
PROPERTIES

IDENTIFIERS: PE61102F WU AFOSR 2305B1

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

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IDENTIFIERS.   (U) PE61102. WUAFOSR2312ZA3

AD-A173 155   5/10   6/16

NEW YORK UNIV N Y

(U) Neuromagnetic Investigation of Workload and Attention.

DESCRIPTIVE NOTE: Rept. no. 1 (Final) 1 Jan 82-31 Dec 84.

JUN 86   51P

PERSONAL AUTHORS: Kaufman,Lloyd ;Williamson,Samuel J. ;

CONTRACT NO.   F49620-82-K-0014

PROJECT NO.   2313

TASK NO.   A4

MONITOR: AFOSR
TR-86-0913

UNCLASSIFIED REPORT

ABSTRACT.   (U)   During the period covered by this report,
we made major advances in the technology associated with
neuromagnetic measurements. These included the
demonstration of the effectiveness of electronic
cancellations in reducing unwanted effects of ambient
field noise. We also developed a high-precision sensor
positioning system. designed and constructed a device for
accurately positioning the subject's head under the
sensors. and developed advanced software for a multi-
sensor system. Experiments during this period included
one in which we demonstrated modulation of the EEG
coincident with the onset of the N100 component of a
visual response to infrequent stimuli presented under the
oddball paradigm. We collaborated on another experiment
with the Cognitive Psychophysiology Laboratory of the
University of Illinois in a study of P300 related to the
presentation of alphanumeric stimuli. The results
confirmed over earlier findings using abstract visual
stimuli, i.e., the equivalent current dipole source of
P300 is in or near hippocompal formation.

DESCRIPTORS: (U)   *PSYCHOPHYSIOLOGY. *WORKLOAD.
*ATTENTION. *PERFORMANCE(HUMAN). *MAGNETOENCEPHALOGRAMS.
ELECTROENCEPHALOGRAPHY. COGNITION. RESPONSE. MAPPING.
MULTISENSORS. HIPPOCAMPUS. ELECTRIC CURRENT. SIGNAL TO
NOISE RATIO. VISUAL CORTEX. STIMULI. BRAIN

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AD-A173 152   7/4

OKLAHOMA STATE UNIV STILLWATER   DEPT OF CHEMISTRY

(U) Dynamics of Unimolecular Dissociation of Silylene.

APR 86   9P

PERSONAL AUTHORS: NoorBatcha,I. ;Raff,Lionel M. ;Thompson,
Donald L. ;Viswanathan,R. ;

CONTRACT NO.   AFOSR-82-0311

PROJECT NO.   2303

TASK NO.   A2

MONITOR: AFOSR
           TR-86-1043

UNCLASSIFIED REPORT

ABSTRACT: (U)   The semiempirical valence-bond surface
formulated for the unimolecular dissociation of SiH2 has
been fitted to an analytical function of the type
suggested by Murrell and co-workers. The fitted surface
accurately represents most of the experimental and CI
results. The dynamics of the unimolecular dissociation of
SiH2 to form Si and H2 have been investigated by
classical trajectory methods on this fitted surface. The
effect of describing the initial state of the molecule
using normal and local mode approximations has been
studied. In spite of the presence of the heavier atom, no
bond or mode specificity is observed. The product energy
distribution is found to be statistical. Using the RRK
model, the high-pressure limiting rate coefficient is
found to be k(T, infinity) = 3.38 X 10 to the 12th power
exp (-61.GKCAL/MOL/RTs, which is less than the
dissociation rate for SiH4. This has been attributed to
the higher activation energy for SiH2 and to a
statistical factor.

DESCRIPTORS   (U)   *SILANES, *CHEMICAL DISSOCIATION,
*MOLECULAR PROPERTIES, SURFACES, TRAJECTORIES, REACTION
KINETICS, COEFFICIENTS, ACTIVATION ENERGY, STATISTICAL
PROCESSES, ENERGY TRANSFER, POTENTIAL ENERGY, VAPOR
DEPOSITION, REPRINTS

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A173 152   CONTINUED

IDENTIFIERS: (U) *Silylene. PE61102F WUAFOSR2303A2

AD-A173 151   7/5   7/4

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Vibrationally State-Selected Reactions of Ammonia Ions.
     1. NH sub 3+ (V) +D sub 2.

MAY 86   12P

PERSONAL AUTHORS: Morrison,Richard J. ;Conaway,William E.
     ;Ebata,Takayuki ;Zare,Richard N. ;

CONTRACT NO.   F49620-85-C-0021

PROJECT NO.   2307

TASK NO.   A2

MONITOR: AFOSR
           TR-86-1016

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub in Jnl. of Chemical Physics. v84
n10 p5527-5535. 15 May 86.

ABSTRACT: (U)   Resonance enhanced multiphoton ionization
has been applied to the production of vibrationally state-
selected ion beams. Ammonia ions are selectively formed
with a specific number of vibrational quanta in the v sub
2 umbrella bending mode. The effect of vibrational
excitation of this mode on the reaction of $NH_3(+)$, $(X, v =$
0 to 9) with D2 is examined over the 0.5 to 10eV center-
of-mass kinetic energy range in a tandem quadrupole mass
spectrometer. Under these conditions. (1) abstraction of
a D atom to form $NH_3D(+)$ is the dominant reaction channel.
(2) $NH_3D(+)$ having sufficient internal energy may
decompose to yield $NH_2D(+)$ and this decomposition process
is enhanced by vibrational excitation of the $NH_3(+)$
reagent. and (3) $NH_2D(+)$ is also formed by direct
hydrogen-deuterium exchange of $NH_3(+)$ with D2. but this
channel appears as a minor contribution which is
insensitive to the vibrational excitation of the $NH_3(+)$.
A spectator stripping model is able to account for the
ratio of $NH_2D(+)$ to $NH_3D(+)$ as a function of the $NH_3(+)$
translational and vibrational energy.

DESCRIPTORS: (U) *CATIONS, *AMMONIA, *PHOTOIONIZATION.
*ION BEAMS. VIBRATIONAL SPECTRA. EXCITATION, DEUTERIUM.
KINETIC ENERGY. EXCHANGE REACTIONS. REPRINTS.

AD-A173 151

VIRGINIA INST OF MARINE SCIENCE GLOUCESTER POINT

(U) Solution of Hydrocarbons in a Hydrocarbon-Water System with Changing Phase Composition due to Evaporation.

MAR 86   4P

PERSONAL AUTHORS : Burris, David R. ; MacIntyre, William G. ;

UNCLASSIFIED REPORT

ABSTRACT: (U)   Pure water was brought into contact with a four-component liquid hydrocarbon phase comprised of methylcyclohexane, ethylbenzene, tetralin, and 1-methylnaphthalene. The headspace above the hydrocarbon phase was continually purged with N2 to provide a controlled evaporative loss. Hydrocarbon concentrations in the water and hydrocarbon phases changed due to dissolution and evaporation and were measured as a function of time. A surface renewal mass transfer model is congruent with the observed hydrocarbon concentrations in the aqueous phase. Hydrocarbon-phase composition and component interactions are important in determining the time dependence of the aqueous phase composition. The results have implications concerning the fate of components of petroleum products discharged in the aquatic environment.

DESCRIPTORS: (U)   *HYDROCARBONS, *WATER, *PHASE STUDIES, *EVAPORATION, LIQUID PHASES, METHYL RADICALS, HEXANES, ETHYL RADICALS, BENZENE NAPHTHALENES, NITROGEN, PURGING, MASS TRANSFER, OIL SPILLS, REPRINTS

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVN54B

AD-A173 146   12/1   AD-A173 145   7/5   7/3

NORTH CAROLINA STATE UNIV AT RALEIGH DEPT OF MATHEMATICS   COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Index Two Linear Time Varying Singular Systems of
Differential Equations II.

(U) Modification of Chemical Reactivity by Cyclodextrins:
Observation of Moderate Effects on Norrish Type I and
Type II Photobehavior.

86   12P   86   5P

PERSONAL AUTHORS: Campbell,Stephen L.   PERSONAL AUTHORS: Singh,Sharat ;Usha.Govindarajan ;Tung,
Chen-Ho ;Turro,Nicholas J. ;Ramamurthy,Vaidhyanthan ;

CONTRACT NO   AFOSR-84-0240. NSF-DMS83-18026   CONTRACT NO   AFOSR-84-0040

PROJECT NO   2304   PROJECT NO   2303

TASK NO   A1   TASK NO. B2

MONITOR   AFOSR   MONITOR   AFOSR
TR-86-1040   TR-86-1020

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub. in Circuits Systems Signal
Process. v5 n1 p97-107 1986

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organic Chemistry.
v51 n6 p941-944 1986.

ABSTRACT   (U)   Linear time varying singular systems of
differential equations of the form A(t)x(t) + B(t)x(t)
= f(t) where A(t) is singular and the system has index at
most two are considered. Recent results on their analytic
solution are improved on. Examples are given that show
these results are not easily extended.

ABSTRACT.   (U)   The photochemistry and photophysics of
organic molecules in organized assemblies are being
studied with great interest in order to understand the
features controlling the selectivity in the
photoreactions brought about by these media. These
studies have paved the way to an intriguing number of
possibilities by which photoreactivity can be modified.
In this connection, we have investigated the
photobehavior of a number of phenyl alkyl ketones and
alpha, alpha-dimethylphenyl alkyl ketones incorporated in
the hydrophobic interior of cyclodextrin cavities. It was
anticipated that a cyclodextrin cavity might impose
certain constraints on product formation from the type I
and type II processes, which these ketones undergo.

DESCRIPTORS   (U)   LINEAR SYSTEMS, THEOREMS, DIFFERENTIAL
EQUATIONS, AIR FORCE RESEARCH, REPRINTS

DESCRIPTORS: (U)   *PHOTOCHEMICAL REACTIONS, *KETONES,
*PHENYL RADICALS, *ALKYL RADICALS, CYCLIC COMPOUNDS,
STARCHES, CAVITIES, HYDROPHOBIC PROPERTIES, REPRINTS

IDENTIFIERS   (U)   Linear Time Varying Singular Systems.
PE61102F   WUAFOSR2304A1

IDENTIFIERS   (U)   Photophysics, Cyclodextrin, PE61102F,
WUAFOSR2303B2

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nonlinearities. Finite element modeling generally failed to predict the measured vibration modes and the unusual characteristics

DESCRIPTORS: (U) *SPACE SYSTEMS, *STRUCTURAL PROPERTIES, *CONTROL SYSTEMS, DAMPING, VIBRATION, DYNAMICS, ACTUATORS, FLEXIBLE STRUCTURES, GRIDS, WAVE PROPAGATION, DYNAMIC RANGE, SPACECRAFT COMPONENTS, SATELLITE ANTENNAS

IDENTIFIERS: (U) LSS(Large Space Structures), PE61102F, WUAFOSR2302B1

AD A173 144

VIRGINIA POLYTECHNIC INST AND STATE UNIV BLACKSBURG DEPT OF AEROSPACE AND OCEAN ENGINEERING

(U) Experimental Study of Active Vibration Control

DESCRIPTIVE NOTE Annual technical rept 1 Jun 85-30 Jun 86

JUL 86

PERSONAL AUTHORS Hallauer, William L Jr; Rubis, Anthony J Jr

CONTRACT NO F49620 85 C 0024

PROJECT NO 2302

TASK NO B1

MONITOR AFOSR TR 86 1003

UNCLASSIFIED REPORT

ABSTRACT (U) Complementary experimental/theoretical studies were conducted on three separate topics, all of which are related to the dynamics and control of highly flexible large space structures (LSS) in Earth orbit: (1) active damping of vibrations; (2) structural wave propagation; and (3) development of small flexible laboratory structures having a maneuverable rigid body mode. In the active damping study on a laboratory structure of moderate modal complexity, very good agreement was achieved between experimental measurements and theoretical predictions. The type of active damping applied output feedback with dual (colocated) control sensors and actuators should be considered as a candidate for implementation on first generation LSS because of its stability robustness. The study of wave propagation is focused primarily on transient flexural response of a two dimensional grid structure to a suddenly applied sinusoidal force at one point. The study is not complete so results are not presented. New laboratory structures with a maneuverable rigid body mode were built and analyzed. They were relatively simple planar structures composed of thin walled beam members. They exhibited some unusual dynamic characteristics such as variable natural frequencies, snap buckling, and other

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DTIC REPORT BIBLIOGRAPHY

AD-A173 143   212   7/4

FLOW RESEARCH CO   KENT WA

(U) Direct Numerical Simulation of an Unpremixed Jet Flame.

DESCRIPTIVE NOTE   Annual rept   16 Feb 85-16 Feb 86.

MAR 86   55P

PERSONAL AUTHORS   Givi,P ,Jou,W H ,Metcalfe,R W

REPORT NO   FLOW-TR-369

CONTRACT NO   F49620-85-C-0067

PROJECT NO   2308

TASK NO   A2

MONITOR   AFOSR
           TR 86-1063

UNCLASSIFIED REPORT

ABSTRACT   (U)   Direct numerical simulations have been
used to study the effects of large coherent structures in
two-dimensional unpremixed chemically reacting mixing
layers under both temporally evolving and spatially
developing assumptions. In the temporally evolving mixing
layer calculations a temperature dependent chemical
reaction was incorporated into a computer code that uses
pseudospectral numerical methods. The nonequilibrium
effects leading to the local quenching of a diffusion
flame were investigated Results indicate that the
primary important parameter to be considered for flame
extinction is the local instantaneous scalar dissipation
rate convoluted at the scalar stoichiometric value. At
locations where this value is increased beyond a critical
value the local temperature rate drops to zero leading to
instantaneous reaction rate drops to zero leading to
local quenching of the flame. Purposes of simulating
spatially developing flows a two dimensional hybrid
pseudospectral finite difference code was constructed
The resulting code was tested with simulations of the
spatially developing flows a two dimensional hybrid
transitional region of laboratory mixing layers
comparison of some of the statistical quantities
.... the results of these simulations are in
... . agreement with recent experimental data
obtained at the California Institute of Technology and

AD-A173 143   CONTINUED

Stanford University. The asymmetric nature of the mixing
processes has been numerically simulated.

DESCRIPTORS   (U) *FLAMES, *JET FLAMES, COMPUTERIZED
SIMULATION, DISSIPATION, FINITE DIFFERENCE THEORY, TWO
DIMENSIONAL, CHEMICAL REACTIONS, ALGORITHMS, CHEMICAL
REACTIONS, COHERENCE, COMPUTATIONS, DIFFUSION, EXTINCTION,
FLOW, JET FLAMES, LABORATORIES, LAYERS, MATHEMATICAL
MODELS, MIXING, NUMERICAL ANALYSIS, QUANTITY, QUENCHING,
RATES, REACTION TIME, SCALAR FUNCTIONS, STOICHIOMETRY,
STRUCTURES, TEMPERATURE

IDENTIFIERS   (U) Diffusion flames, Flame liftoff mixing
layers reaction rates temperature dependence

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CONTINUED

loadings to predict the extent of porewater pressure
increases in the field from buried, contained charges in
saturated soils. A finite difference analysis that
represents the saturated soil as a two-phase medium has
been performed. The analysis accounts for the nonlinear,
inelastic behavior of the soil skeleton and has shown
that liquefaction is dependent upon the unloading
constrained modulus of the soil.

DESCRIPTORS: (U) *SAND *LIQUEFACTION. *SOIL MECHANICS.
BLAST LOADS. TRANSIENTS. PORE PRESSURE. SATURATION.
DYNAMIC TESTS. LABORATORY TESTS. COMPRESSIVE PROPERTIES.
WATER. STRESSES. ONE DIMENSIONAL. TWO PHASE FLOW. HIGH
DENSITY. STRESS STRAIN RELATIONS. UNLOADING. FINITE
DIFFERENCE THEORY. MODEL TESTS. SCALING FACTORS.
MATHEMATICAL PREDICTION

IDENTIFIERS: (U) Porewater pressure. Saturated soils.
PE61102F WUAFOSR2307C1

AD A173 137

UNCLASSIFIED

PERSONAL AUTHORS: Charlie Wayne A. Veyvera George L.
Borehring George R. Holt Steven R.

DESCRIPTIVE NOTE: Final rept 1980-1985

OCT 85

CONTRACT NO: AFOSR-80-0260

PROJECT NO:

TASK NO: 01

MONITOR: AFOSR
TR 86 0385

UNCLASSIFIED REPORT

ABSTRACT: (U) An experimental apparatus was developed to
investigate transient and long-term porewater pressure
responses of saturated soils. The facility is capable of
generating compressive shock loadings on the order of
35000 psi with millisecond rise times to peak stress.
This investigation represents an effort to examine and
establish an understanding of compressionally induced
liquefaction. Samples of water saturated Monterey No. 0
30 sand were examined at various relative densities and
effective stresses. Boundary conditions used for the
experiments were one-dimensional, confined compressive
loadings without lateral strains. Results indicate that it is
possible to liquefy Monterey No. 0-30 sand under these
conditions. Significant porewater pressure increases were
possible even at high densities and high effective
stresses. Liquefaction was generally observed at
compressive strains greater than about 0.1. Threshold
strain values below which substantial porewater
pressures increases generally did not occur, were about 0
to 0.2 percent. Data analysis has provided several
empirical models that can be used to estimate
liquefaction potential as a function of density,
effective stress, and applied compressive strain. One
model uses an empirical scaling law for compressive

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

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AD A173 130   CONTINUED

KMS FUSION INC   ANN ARBOR MI

HETEROGENEITY. HIGH DENSITY. INVERSION. OXYGEN.
POPULATION

(U) Red SOx, Singlet Oxygen Laser. A Chemically-Pumped O
76 Micrometers Singlet Oxygen Laser.

IDENTIFIERS: (U) *Oxygen Lasers. *Chemical Pumping.
PE61102F. WUAFOSR2301A1

DESCRIPTIVE NOTE   Final rept. 1 Jul 31 Dec 85.

FEB 86   37p

PERSONAL AUTHORS   Busch George E.   Appelbein Mark B.

CONTRACT NO   F49620 85 C 0104

PROJECT NO   2301

TASK NO   A1

MONITOR   AFOSR
          TR 86-0961

UNCLASSIFIED REPORT

ABSTRACT   (U)   The feasibility of a red singlet oxygen
laser based on production of (b) state singlet oxygen by
the electronic energy pooling reaction of (a) state
singlet oxygen was investigated. A microwave discharge-
flow system for studying the quenching kinetics of (b)
state oxygen was constructed with a large diameter
viewing region so as to ensure that heterogenous
quenching of both (a) and (b) state oxygen was
unimportant. An upper bound for quenching of (b) state
oxygen by (a) state oxygen was measured and was not found
to be extremely large compared to the rate constant for
quenching of (b) state oxygen by ground state oxygen. The
rate constants for quenching of both (b) state oxygen and
(a) state oxygen by ground state oxygen was measured.
Both rate constants agreed well with those measured by
previous workers. The results suggest that the extent of
the effective population inversion of (b) state oxygen
produced by pooling will not be suppressed by the
high densities of (a) state oxygen initially present. The
measurements reported here support the feasibility of the
red singlet oxygen red SOx laser and further research
and development toward this goal is recommended

DESCRIPTORS   CHEMICAL LASERS. RED COLOR.
QUENCHING. POPULATION.   ELECTRONIC STATES.
PUMPING (ELECTRONICS)   ELECTRON ENERGY. GROUND STATE.

AD A173 130

UNCLASSIFIED REPORT

ABSTRACT: (U) Most industrial polymers are of course carbon-based with main cabins consisting entirely of carbon atoms (as in vinyl and diene polymers) or mainly so (as for polyesters, polyamides, etc.). Two classes of synthetic polymers based on inorganic main chains are however commercially important: the well known silicones, with polymer chains made up of alternating silicon and oxygen atoms, and the newer polyphosphazenes, with alternating phosphorus and nitrogen atoms in the backbone. The polysilanes represent a new class of polymers which may now be approaching commercialisation, in which the polymer chain is made up entirely of silicon atoms. Interest in the polysilanes derives partly from their unusual constitution and behavior, and partly from their potential technological utility. Industrial applications are now being studied in laboratories in many parts of the world.

DESCRIPTORS: (U) POLYSILANES, SILICON ATOMS, INDUSTRIAL PRODUCTION, UTILIZATION, SYNTHESIS, SILICON CARB DES, PHOTORESISTORS, MICROELECTRONICS, REPRINTS

IDENTIFIERS: (U) WUAFOSR2303B2, PE61102F

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UNCLASSIFIED

UNCLASSIFIED REPORT

ABSTRACT: By means of the combined use of metastable quenching spectroscopy (MQS), thermal desorption spectroscopy (TDS) and electron stimulated desorption ion angular distribution (ESDIAD), evidence has been found for reversible bonding geometry ... CO chemisorbed on the Ni(110) surface ... over the range of approx 90 - 120 K the CO chemisorption at 115 from its surface normal ... their ... 0.65 ML to an off normal ... critical coverage. Keywords: Penning ...

DESCRIPTORS: (U) CARBON MONOXIDE, ADSORPTION, SURFACE CHEMISTRY, CHEMISORPTION, NICKEL, OPTIMIZATION DIRECTION, ANGLES, DESORPTION, DISTRIBUTION, ELECTRONS, IONIZATION, IONS, METASTABLE STATE, QUENCHING, SPECTROMETRY, SPECTROSCOPY, TEMPERATURE, THERMAL PROPERTIES

IDENTIFIERS: (U) WUAFOSP2212A3, PE61102F

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO EVN54B

AD A173 123   9 4   12 1   1/4

NORTHWESTERN UNIV EVANSTON IL

U A Design Methodology for Robust Stabilizing
Controllers,

86   7p

PERSONAL AUTHORS   Schmitendorf William E

CONTRACT NO   AFOSR 85 0051

PROJECT NO   2304

TASK NO   A2

MONITOR   AFOSR
TR 86 1035

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in Proceedings of the AIAA
Guidance and Control Conference p657 661 Jun 86

ABSTRACT   (U) This paper considers the problem of
designing control laws for linear systems with two
varying uncertainties. A method for determining a linear
feedback control which stabilizes the system for all
possible uncertainties is presented. This control is robust
in the sense that it guarantees asymptotic stability
regardless of the disturbances. The results are applied to
several aircraft examples.

DESCRIPTORS   (U)   STABILIZATION SYSTEMS, FEEDBACK,
CONTROL THEORY, LINEAR SYSTEMS, OPTIMIZATION, TIME,
SYSTEMS, FEEDBACK CONTROL, SYSTEMS, MILITARY, AIRCRAFT,
FEEDBACK, VIBRATION DAMPING, REPRINTS

IDENTIFIERS   (U)   Robust control, Uncertain systems,
PE61102F, WUAFOSR2304A1

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...ipulating program are subsequently executed on a real robotic testbed

DESCRIPTORS (U) MANIPULATORS ROBOTICS COMPUTER
PROGRAMMING ALGORITHMS ASSEMBLY DETECTORS ERRORS
FEEDBACK MOTION OFF LINE SYSTEMS ROBOTS
SENSES PHYSIOLOGY SEQUENCES SIMULATION SPATIAL
DISTRIBUTION TEST BEDS

IDENTIFIERS (U) LFN SRI 7239 PE61102F WUAFOSR2306A1

CONTRACT NO F1962 81 K 0007

PROJECT NO 2306

TASK NO A1

MONITOR SRI 70 85 441
70 85 AD A173 86 4127

UNCLASSIFIED REPORT

ABSTRACT (U) This report summarizes research in some
based programming that make programming of flexible robotic
assembly tasks easier. It describes initial efforts at
implementing a system using an interactive graphic offline
programming system called WORKMATE. Results described in
five technical papers include a powerful and
efficient method developed for estimating compounded
and reduced positional uncertainties among sensors,
robots and objects based on their individual uncertain
sent at robot joints. This method is useful in
determining spatial errors in a planned task sequence
... an acceptable tolerances 2 a fast
... of gripping hardware in our silicon
graph logic ... workstation was developed to
determine if a robot and moving manipulator will collide
... manipulator and objects in its positions. The method
... implemented in WORKMATE which can graphically
... the robot at the manipulator penetrating any of
... objects in its animation, speed of 1 to 5 pictures sec
... robots ... can be closed using different sensor
... to estimate the grasping error from a
... position up an object. This error can be
... programmed in program application of the manipulator's
... position of off line assembly programming
... to requiring
... programmed entirely off line and

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UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN548

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to use the specifications of these devices and other high speed switching technologies in order to determine better designs and fundamental limits of the binary optical computing architectures under consideration.

DESCRIPTORS: (U) *SIGNAL PROCESSING, *OPTICAL PROCESSING, *HOLOGRAMS, *NONLINEAR SYSTEMS, *COMPUTER ARCHITECTURE, HYBRID SYSTEMS, NOR GATES, DIGITAL SYSTEMS, ANALOG SYSTEMS, NAND GATES, REAL TIME ARRAYS

IDENTIFIERS: (U) MQW=Multiple Quantum Wells, Optical Computing, Parallel Output, Xor Gates, SBWP Space Bandwidth Product, Interconnection Holograms, Binary Elements, Xnor Gates, Optical Interconnections, Arrays, Binary Parallel Inputs, Sequential logic, Bistability PE61102F WUAFOSR2305B1

AD-A173 1   20 6   9 2

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES SIGNAL AND IMAGE PROCESSING INST

(U) Nonlinear Real Time Optical Signal Processing

DESCRIPTIVE NOTE: Annual rept. 1 Jul 84-30 Jun 85

PERSONAL AUTHORS: Sawchuk, A. A.

CONTRACT: AFOSR-84-0181

PROJECT NO.

TASK NO.

MONITOR:

UNCLASSIFIED REPORT

ABSTRACT: (U) During the period 1 July 1984 - 30 June 1985, work under Grant AFOSR-84-0181 has concentrated in four major areas. First work has addressed a programmental sequential optical binary parallel architecture that is constructed from an array of holographic optical switching elements. Nor gates with optical inputs have been experimented with improved optical switching speed by a computer generated hologram has been developed, high efficiency interconnection methods for array interconnection holograms with product space bandwidth product interconnection at the general interconnection method of this larger. Next we experimented with great utilities of the general system with methods of ... Next we examined digital first hologram ... to use of hybrid ... interconnection the mappings ... product diagrams into optical logical and hologram array ... and optimization procedures... determine the minimum set of necessary procedures... basis functions and minimum set of space... the operations holograms. Another area of study has ... the realization of devices and materials for high speed optical switching and bistability switching for high ... optical ... and response times of 10 ns have ... dynamic ... ... at the University of ... ... holographic recording by means of Fabry-Perot ... a nonlinear medium of ... have begun

AD-A173 119

WISCONSIN UNIV MADISON DEPT OF CHEMISTRY

Possible Pi Complex Intermediates in the Reaction of
Disilenes with Mercury(II) Trifluoroacetate.

86   3P

PERSONAL AUTHORS Zybill,Christian ;West,Robert

CONTRACT NO   F49620-83-C-0044

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
               TR 86-1013

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Chemical Society.
Chemical Communications, p857-858 1986

ABSTRACT: (U)   The well-known reaction of mercury(II)
compounds with alkenes is generally believed to involve
formation of a Pe-complex mercurinium ion in the initial
step. Mercurinium ions have been observed by n.m.r.
spectroscopy in superacid solvents at low temperatures,
and for special cases in other polar solvents. On the
other hand the n.m.r. spectra of mixtures of simple
alkenes with mercury(II) trifluoroacetate (1) in benzene
indicate that the initial reaction product is a o-bound
species. (2) Also Fukuzumi and Kochi have shown that
alkenes form weak charge-transfer complexes with mercury
salts in dichloromethane. the reaction of mercury(II)
trifluoroacetate with disilenes and in tetrahydrofuran at
25 C produces 1,2-bis-trifluoroacetoxy-disilanes (5) and
(6a,b); below -15 C n.m.r spectra indicate that an
intermediate is formed, for which structures (7) and (8a,
b) are proposed.

AD A173 103

Development and Evaluation of Search and Detection Models

DESCRIPTIVE NOTE: Annual rept.

DEC 85

PERSONAL AUTHORS Pennington Jeffrey L.

CONTRACT NO   AFOSR 83-0278

PROJECT NO   2304

MONITOR   AFOSR
              TR 85-1085

UNCLASSIFIED REPORT

ABSTRACT: (U)   The mathematical model presented in this
paper is beyond the state-of-the-art for existing
mathematical programming software. Based on this working
paper and discussions with Lt Col McLain, Professor
Pennington proposed a research plan to refine the McLain
model and computationally investigate new algorithms for
solving the model. McLain and Camielewski collected the
data and developed the model generator while Pennington
and his students investigated alternative solution
algorithms. This dissertation presents a new technique
for solving very large multicommodity network flow
problems. This problem is an extremely large casualty
evaluation problem to be used by the Air Force in forming a
plan for the evacuation of wartime casualties. This plan
would be implemented in case of a European military
conflict involving United States troops.

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A173 102   7/4   14/5

PITTSBURGH UNIV   PA SURFACE SCIENCE CENTER

(U) An Enhanced Electron Stimulated-Desorption Ion Angular
     Distribution Method for Imaging Molecular Orientations
     of Adsorbed Species.

JUN 86   6P

PERSONAL AUTHORS: Dresser,M. J. ;Alvey,M. D. ;Yates,J. T.
   Jr.;

CONTRACT NO.   AFOSR-82-0133

PROJECT NO.   2303

TASK NO.   A2

MONITOR: AFOSR
            TR-86-1027

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Vacuum Science
   Technology, vA4 n3 p1446-1450 May-Jun 86.

ABSTRACT   (U)   A striking improvement has been made in
   the quality of positive ion angular distribution data
   obtained in electron-stimulated-desorption ion angular
   distribution (ESDIAD). The improved method has been used
   to study configurational changes in chemisorbed CO on
   Ni(110), which are induced by intermolecular interactions
   at high coverage. CO molecules adsorbed with normal C-O
   bond orientations on ridge Ni sites tilt away from the
   normal by + or - 19 degs in directions perpendicular to
   the ridges for CO coverages above 0.75 CO/Ni. Evidence
   for the C-O tilting has also been studied as a function
   of electron energy. This has demonstrated that an 0.1s
   excitation process leads to intense and sharp O(+) ESD AD
   beams. The improved ESDIAD method involves the removal of
   a soft x-ray background signal which originates from
   electron impact on the metal surface, and is therefore
   present in all photographic ESDIAD measurements made to
   date. The angular distribution of the background effect
   is independent of electron energy and current density.
   The resultant pure ESDIAD patterns show more quantitative
   details in high and low signal regions than has been seen
   before.

AD A173 102

AD-A173 102   CONTINUED

IDENTIFIERS   Sciences Intermediates, Chemistry;
Tetrahydrofuran PE611021F WUAFOSR2303 82

SPECTRON DEVELOPMENT LABS INC COSTA MESA CA

U   Droplet Sizing Research Program

DESCRIPTIVE NOTE   Final rept 15 Jan 83 15 Jan 86

MAR 86   137p

PERSONAL AUTHORS   Hess, Cecil F

REPORT NO   SDL-85-2286-15F

CONTRACT NO   F49620 83-C-0060

PROJECT NO   2308

TASK NO   A3

MONITOR   AFOSR
          TR-86-0875

UNCLASSIFIED REPORT

ABSTRACT   (U) A three-year program in droplet sizing
research has been completed The major accomplishments
include (1) Establishing the errors and limitations
associated with the Visibility technique; (2) Development
of two new techniques utilizing absolute scattered light;
(3) Extension of techniques to submicron particles; (4)
Extension of techniques to nonspherical drops; (5) A
solid spray diagnostic capability which has been
synergistic with many programs from other agencies of the
Air Force AEDC, BMO, Wright-Patterson), the Government
and Industry. The new techniques have been applied to the
measurement of sprays and solid particles with accuracies
better than 10% and dynamic ranges between 10 and 30.
Complex bimodal, trimodal and quadramoda, distributions
have been measured with an accuracy and resolution
exceeding all available techniques Keywords: Particle
velocity, Mass flux, Nonintrusive, and Advanced laser
diagnostics

DESCRIPTORS   (U) *MASS FLOW, *SPRAYS, *AEROSOLS,
*OPTICAL DETECTION, SIZES(DIMENSIONS), LASER APPLICATIONS,
DYNAMIC RANGE, ACCURACY, DIAGNOSIS(GENERAL), DROPS,
DYNAMIC RANGE, FLUX(RATE), LASERS, LIGHT SCATTERING,
PARTICLES, SOLIDS, VELOCITY, VISIBILITY

AD A173 100

PAGE   82   EVN54B

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A173 100   CONTINUED

IDENTIFIERS   (U) 61102F. WUAFOSR2308A3

SEARCH CONTROL NO. EVN54B

AD-A173 098   21/1

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF
MECHANICAL ENGINEERING

(U) Transient Catalytic Combustion.

DESCRIPTIVE NOTE: Annual rept. 30 Sep 84-30 Sep 85.

JAN 86   29P

PERSONAL AUTHORS: Santavicca,D. A. ;

CONTRACT NO. AFOSR-84-0224

PROJECT NO 2308

TASK NO. A2

MONITOR: AFOSR
TR-86-1004

UNCLASSIFIED REPORT

ABSTRACT   (U) Results of an experimental study of the
catalytic ignition of lean propane-air mixtures on
platinum in a stacked-plate catalytic combustor are
presented. The effects of inlet temperature, equivalence
ratio and gas velocity on the ignition transient were
investigated. The ignition process was characterized in
terms of the substrate axial temperature profile and the
exhaust gas CO and CO2 concentrations measured as a
function of time after the fuel was turned on. Ignition
was always found to occur first near the leading edge of
the catalyst as indicated by the more rapid heat-up of
the front end of the catalyst. The downstream end of the
catalyst heated up more slowly and was strongly dependent
on convective heat transfer from the front of the
catalyst. Increased inlet temperature, equivalence ratio
d velocity were all found to shorten the ignition
transient and to lead to increased steady state peak
substrate temperatures. Increased velocity also caused
the peak substrate temperature to move further toward the
back of the catalyst. For the conditions studied, the
initial ignition rate was found to be surface reaction
rate controlled at higher velocities (above 2 m/s) but at
lower velocities (below 2 m/s) the initial ignition rate
was found to depend both on the surface reaction rate and
the mass transport rate. The transient ignition
measurements also clearly revealed the fact that complete

AD-A173 098

AD A173 092   7 4

CALIFORNIA UNIV SANTA BARBARA DEPT OF CHEMISTRY

(U) Energy Dispos l in Ion Molecule Reactions: Experiment and Theory.

DESCRIPTIVE NOTE: Final rept 15 Nov 81-14 May 86.

AUG 86   6P

PERSONAL AUTHORS: Bowers,Michael T ;

CONTRACT NO   AFOSR-82-0035

PROJECT NO.   2303

TASK NO   B1

MONITOR   AFOSR
           TR-86-0936

UNCLASSIFIED REPORT

ABSTRACT: (U) During the tenure of this grant work was accomplished in 3 areas: A. Determination of Energy Disposal in Simple Unimolecular and Bimolecular Reactions B. Determination of the Effects of Internal Energy on the Rates and Branching Ratios of Bimolecular Reactions. C. Determination of the Dynamics and energy Disposal in the Photodissociation of Simple Cluster Ions. Kinetic energy measurements on the products of reactions of $C+$ Superscript 2F with $O2$ and $N2$ were also initiated.

DESCRIPTORS: (U) *CHARGE TRANSFER, *REACTION KINETICS, DETERMINATION, ENERGY, KINETIC ENERGY, DISPOSAL, CHEMICAL REACTIONS, PHOTODISSOCIATION, CLUSTERING, CARBON, SULFITES, OXYGEN, NITROGEN OXIDES, MOLECULES, DYNAMICS, INTERNAL, MEASUREMENT, RATIOS, IONS

IDENTIFIERS: (U) *Ion Molecule Interactions, Internal Energy WUAFOSR2303B1, PE61102F

AD A173 092

PAGE   84   EVN54B

DESCRIPTORS: (U) *COMBUSTION, *IGNITION, *CATALYSIS, *FUELS, PROPANE, FUEL AIR RATIO, PLATINUM, COMBUSTORS, TEMPERATURE RATIOS, GAS FLOW, FLOW RATE, EXHAUST GASES, CARBON MONOXIDE, CARBON DIOXIDE, CONCENTRATION, CHEMISTRY, CONVECTION, HEAT TRANSFER, TURBULENCE, FLAME PROPAGATION

IDENTIFIERS: (U) WUAFOSR2303A2, PE61102F

AD A173 092

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-173 091   20 4   AD-A173 091   CONTINUED

MICHIGAN STATE UNIV EAST LANSING TURBULENCE STRUCTURE   STRUCTURAL PROPERTIES, REYNOLDS NUMBER, PRESSURE
LAB   GRADIENTS, DRAG REDUCTION

(U) Experimental Investigation of the Turbulence   IDENTIFIERS: (U) WUAFOSR2307A2. PE61102F
Production Mechanism in Boundary Layers

DESCRIPTIVE NOTE: Annual rept 1 Oct 84 30 Sep 85

AUG 85   41P

PERSONAL AUTHORS: Falco R E

REPORT NO   TSL-85-3

CONTRACT NO   F 9520-85 C 0002

PROJECT NO   2307

TASK NO   A2

MONITOR   AFOSR
           TR 86 0942

UNCLASSIFIED REPORT

ABSTRACT   (U)   Over the past year we have discovered the
mechanism of production of the long streaks and a
mechanism for creation of vortex rings like typical eddies
and have demonstrated the occurrence of both within a
real turbulent boundary layer. This diagnosis were the
missing bits needed to complete our conceptual
structural model. This model describes the importance
of vortex vortices in wall layer transport. However
experiments determination of the relative importance of
each of the elements of the model of the Reynolds number
layer is far from complete and we know very little of
the Reynolds number dependence or pressure gradient
dependence of the model. What we have learned so far
suggests several critical parameters that can be
controlled to control the production of turbulence and
hence reduce drag. In the proposed research we want to
focus on acquiring additional data to support the
structural theory that has been formed so as to provide the
means for determining how much leverage we have in our
control of wall boundary layer turbulence.

20 .   TURBULENT PRODUCTION ...... BOUNDARY
.... VORTEX TECHNIC FLUID MECHANICS VORTICES

AD-A173 091

YTTERBIUM

IDENTIFIERS (U) PER1102F WUAFOSR23025

UNCLASSIFIED REPORT

ABSTRACT (U) The objectives and results of a research
effort undertaken to understand the response of ytterbium
stress transducers under shock loading are presented
Plate impact experiments using matrix materials that
covered a wide range of mechanical impedances were
performed to determine the gauge response under well
characterizing conditions Experiments were designed to
conform closely to the requirements of the theoretical
analysis Residual resistance measurements, loading rate
effects, and effect of matrix property variations were
examined in detail Quasi static experimental methods and
related analysis were developed to determine the complete
set of electro mechanical constants for the foils of
interest The phenomenological model developed earlier
was extended to include strain hardening in a consistent
manner The model predictions, using the appropriate
material constants, agreed very well with the shock wave
measurements Using the analytic model a good
understanding of ytterbium stress transducers was
achieved

AD-A173 085

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVN54B

AD A173 083   22 1   9 4   12 1   AD-A173 083   CONTINUED

INTEGRATED SYSTEMS INC PALO ALTO CA
                                                        Systems. Transient analysis of adaptive control. Fixed-
U   Adaptive Control Techniques for Large Space Structures   point theorems for stability analysis of adaptive systems.
                                                        and Stability theory for adaptive systems.
DESCRIPTIVE NOTE   Annual rept 1 Jun 85 31 May 86
                                                        DESCRIPTORS   (U) *ADAPTIVE CONTROL SYSTEMS. SPACE
SEP 86   117p   SYSTEMS. NONLINEAR SYSTEMS. DYNAMIC RESPONSE. STABILITY.
                                                          CALIBRATION. TRANSIENTS. PARAMETRIC ANALYSIS. EXCITATION.
PERSONAL AUTHORS   Kosut Robert L   Boyd S Merkel G   STOCHASTIC PROCESSES. REAL TIME. ON LINE SYSTEMS. SYSTEMS
                                                          ENGINEERING. ALGORITHMS
REPORT NO   ISI 85
                                                        IDENTIFIERS   (U) Large space structures. Robust control
CONTRACT NO   F49620 85 C 0094   systems. Uncertainty. Nonlinear control. PE61102F.
                                                          WUAFOSR2302B1
PROJECT NO   2302

TASK NO   B1

MONITOR   AFOSR
          TR 86 0845

UNCLASSIFIED REPORT

ABSTRACT   (U) The Large Space Structure (LSS) research
program was originally formulated in response to
increasing concern that performance robustness of Air
Force LSS systems would be inadequate to meet mission
objectives. Uncertainties in both mass and dynamics are
characteristic of LSS systems. Both time varying
...

AD A173 083   PAGE   87   EVN54t

strengths up to twice the static values. Additional
results of high strength plain concrete and on SIFCON
(slurry infiltrated fiber concrete) are reported.

ABSTRACT (U) This report describes a three year
research program whose objectives were to 1. Develop a
loading function for close proximity explosions, 2.
Determine dynamic strength properties for selected types
of concrete, incorporate the strength properties so
determined into a localized failure criterion for
reinforced concrete, 4. Use a structural analysis
elastic plastic finite element computer program to
determine the dynamic response for a concrete steel finite
element imp... and 5. Combine all of these into a simple
structural analysis program to determine the response of
underground structures to localized impulsive loads. A
computational methodology was developed for calculating the
stress induced in a buried wall by the pressure wave
from a buried air burst explosive or cylindrical shape
studies were performed on the response of a reinforced
concrete structure to such a pressure wave loading using
several different computer codes, and incorporating some
of the predictive dynamic concrete material property
... the codes has not proved to be effective in
describing the response observed in experiments
A Split Hopkinson's pressure bar
system was used in testing concrete specimens up to 75 mm
... a built. The system and procedures are
described. Procedures are given to published results.
Including tests on four kinds of high strength concrete
...

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVNS4B

AD-A173 076   7.4

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

U Some Observations on the Use of Photoacoustic
   Spectroscopy for Flame Elemental Analysis.

86   7p

PERSONAL AUTHORS   Lanauze,J. A. ;Winefordner,J. D .

CONTRACT NO   F49520-84-C-0002

PROJECT NO   2303

TASK NO   A1

MONITOR: AFOSR
           TR-85-1030

SUPPLEMENTARY NOTE   Pub. in Spectrochimica Acta, v41B n4
p407-412 1986

ABSTRACT   (U) Photoacoustic spectroscopy has been
applied for the first time as a technique for elemental
analysis in flames. The limit of detection achieved for
Na was 780 ng/ml. For Mn. Sr, Ti and Ca, the sensitivity
was found to be very poor as compared with Na, but no
explanation is available at the moment. Photoacoustic
spectroscopy is not expected to be as sensitive as any of
the now existing spectroscopic techniques for elemental
analysis. Keywords: Photoacoustic; Manganese; Strontium;
Titanium; Flame; Calcium; Reprints; Sodium; Laser
Excitation.

DESCRIPTORS   (U): *QUANTITATIVE ANALYSIS, *EMISSION
SPECTRA, *FLAMES, LASER PUMPING, SODIUM, MANGANESE,
STRONTIUM, TANTALUM, CALCIUM, ACOUSTOOPTICS, HIGH
RESOLUTION, FLUORESCENCE, REPRINTS

IDENTIFIERS   (U): Photoacoustic spectroscopy,
NWUATOR P230341, PE61102F

AD A173 081   12 1   9 1

ARIZONA UNIV TUCSON DEPT OF MATHEMATICS

U Multi-Grid Continuation and Spurious Solutions for
   Nonlinear Boundary Value Problems

DESCRIPTIVE NOTE   Annual rept. 1 Oct 84-1 Jul 85

Jul 85   27p

PERSONAL AUTHORS   Mittelmann,Hans

REPORT NO   55-50

CONTRACT NO   AFOSR-84-0015

PROJECT NO   2304

TASK NO

MONITOR: AFOSR
           TR-86-0328

AD A173 076   PAGE   89   EVNS4B

AD A173 072

DESCRIPTORS PYROLYSIS SILOXANES CYCLIC
COMPOUNDS CURING METHYL RADICALS EPOXY COMPOUNDS
VINYL RADICALS PLASTICS VACUUM RESINS

SEARCH CONTROL NO EVN548

RESEARCH TRIANGLE INST RESEARCH TRIANGLE PARK NC

Study of Mean Free Path Effects on Growth of Ultrafine
Metallic Aerosols

DESCRIPTIVE NOTE Annual rept 1 May 85-30 Jun 86

JUL 86 32P

PERSONAL AUTHORS Lawless Phillip A

CONTRACT NO DAAG29 83 C 00??

PROJECT NO 2306

TASK NO A?

MONITOR ARO50
DR 86 0043

UNCLASSIFIED REPORT

ABSTRACT

UNCLASSIFIED REPORT

ABSTRACT: (U) Neurobiological investigations of adaptive neural networks were conducted using the classically conditioned nictitating membrane response (NMCR) of rabbit, a widely used model system for studies of learning. One experimental approach involved recording from single brain neurons from awake, behaving animals for the purpose of determining the loci and characteristics of neurons with activity correlated with the NMCR or its inhibition. A second approach involved the use of discrete brain lesions that selectively eliminate the NMCR while at the same time sparing the basic reflex pathway. A third approach employed fiber tracing anatomical techniques designed to clarify the interconnectivity among brain regions essential for the NMCR. These regions include discrete portions of the cerebellum and brain stem. Information from physiological studies has been incorporated into mathematical models of learning used by adaptive network researchers, and anatomical findings have guided the development of related neuronal models. Keywords: Neurophysiology; Neuroanatomy.

DESCRIPTORS: (U); *NERVE CELLS; *NEUROPHYSIOLOGY; *LEARNING; *CONDITIONED RESPONSE; ADAPTIVE SYSTEMS; ANATOMY; BIOLOGY; BRAIN; CEREBELLUM; CONTROL; INHIBITION; LESIONS; MATHEMATICAL MODELS; MODELS; NEURAL NETWORKS; NEURAL

AD A173 067

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO EVN548

AD A173 066   20 4   20 5   14/5

(U) Investigation of Superradiant LDV Markers and Three-
     Component Velocity Mapping.

DESCRIPTIVE NOTE   Annual rept 1 Jan-31 Dec 85.

JAN 86   10P

PERSONAL AUTHORS   Chang, Richard K.

CONTRACT NO.   F49620-85-K-0002

PROJECT NO   2308

TASK NO   A3

MONITOR   AFOSR
           TR-86-1006

UNCLASSIFIED REPORT

ABSTRACT   (U)   The major progress in the first year of
AFOSR support has been made in the area of laser
interaction with micron size droplets flowing in a linear
stream. Motivated by our interest in finding bright
fluorescent markers for LDV instruments, we have
continued the study of lasing droplets. Magnified
photographs of lasing droplets reveal that the laser
radiation is confined just within the liquid-air
interface. Whether the actual droplet shape is spherical
or spheroidal. The possibility of providing chemical
sensors identification of ... d droplets from the
nonlinear optical spectra o ... roplets led us to
investigate the stimulated ... scattering, coherent
anti-Stokes Raman scattering ... and coherent Raman mixing
processes within the droplets. Progress in ... works is
summarized. Considerable effort was devoted to developing
an optical technique w ch ... has the potential of providing
three component velocity mapping in three dimensions.
Holographic photograph of ... experiments are currently under
way. With seeded particles in a cold flow, the observed
particle tracks are being analyzed by a novel application
of the Hough transform which is well known in the pattern n
recognition ... field. Progress in this ... area is also
discussed.

DESCRIPTORS   ... COLD FLOW MAPPING LASER

AD A173 066

AD A173 064   20 11

(U)HIGH UNIV BETHLEHEM PA

(U) Fatigue and Fracture Mechanics of Structural Metals,
Plastics, and Composites

DESCRIPTIVE NOTE: Final rept 31 Jan 85-24 Jan 86.

AUG 86   8P

PERSONAL AUTHORS: Hertzberg,Richard W. ;

CONTRACT NO   AFOSR-85-0138

PROJECT NO   3483

TASK NO   A3

MONITOR   AFOSR
            TR-86-0919

UNCLASSIFIED REPORT

ABSTRACT: (U)   AFOSR/DOD-URIP funds were used to purchase
an Instron computer-controlled mechanical test system for
the purpose of evaluating the fatigue and fracture
response of metals, plastics, and composites. The FCP fun
program provided with the test system has been modified
to include differing testing options (constant K sub max
and constant K sub mean decreasing K threshold procedure)
and incorporate stress intensity factor and compliance
calibrations for several additional specimen
configurations. Experiments have been conducted with both
plastics and metals to confirm the usefulness of the
system and the modifications of the software.

DESCRIPTORS: (U) *FRACTURE(MECHANICS),
*FATIGUE(MECHANICS), PLASTICS, COMPOSITE MATERIALS, TEST
METHODS, TEST EQUIPMENT, COMPUTER APPLICATIONS, COMPUTER
PROGRAMS, METALS, MODIFICATION, RESPONSE, STRESS
CONCENTRATION, STRUCTURES

IDENTIFIERS   (U) WUAFOSR3483A3, PE61102F

AD A173 064

IDENTIFIERS   Superconductance

AD A173 064

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A173 063

AD-A173 063   CONTINUED

PROPERTIES   RESOLUTION, STATIONARY

IDENTIFIERS   (U) WUAFOSP2305B1, PE61102F

MOORE SCHOOL OF ELECTRICAL ENGINEERING PHILADELPHIA PA
ELECTRO OPTICS AND MICROWAVE OPTICS LAB

(U) Research in Image Understanding as Applied to 3-D
Microwave Tomographic Imaging with Near Optical
Resolution

DESCRIPTIVE NOTE   Annual rept 1 Sep 83 31 Oct 85

MAR 86   72p

PERSONAL AUTHORS   Farhat N H

REPORT NO   F NO 8

CONTRACT NO   AFOSR 81 0240

PROJECT NO   2305

TASK NO   B1

MONITOR   AFOSR
          TR 86 0643

UNCLASSIFIED REPORT

ABSTRACT   (U) The objectives of research under this grant
are to obtain a fundamental understanding of the dynamics
of coherent and incoherent image formation and inverse
scattering with a view toward spatial and temporal superresolution
and to demonstrate and assess various... by utilizing cost
effective imaging of objects... ... optical
computing... Specific applications are given to 3-D
microwave tomographic imaging. This approach is
presently based on... ... development of... theory of
superresolution... aperture for... ... accuracy and tomographic
reconstruction, which has been... ... on extensively
treated... objects and... ... through
superresolution... aperture... ... ... methodologies for
achievement... quantification of... ... that can be
achieved through... ... density limited... data. ...
based... ... ... band limited microwave scattered
data... ... projection of tomographic images
of... ... targets with... ... optical resolution

DESCRIPTORS   IMAGES, DISPLAY SYSTEMS,

AD-A173 063

UNCLASS IFD

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

Third Order Nonlinear Optical Interaction and
Conformational Transition in Poly 4 BCMU
Polydiacetylene Studied by Picosecond and
Subpicosecond Degenerate Four Wave Mixing

JUN 86   3P

PERSONAL AUTHORS: Rao D. N.; Chopra, Pratibha; Ghoshal,
Sumita K.; Swiatkiewicz, Jacek; Prasad, Paras N.

REPORT NO: SUNYAB/DC/TR 5

CONTRACT NO: F49620-85-C-0052

PROJECT NO: 2303

TASK NO: B3

MONITOR: AFOSR
TR-86-0952

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub in Jnl of Chemical Physics, v84
n12 p7049-7059, 15 Jun 86.

ABSTRACT: (U) Nonlinear optical effects are at the
forefront of research because of their importance in
optical signal processing. Organic polymeric systems
containing conjugated pi electron structure are expected
to play an important role because of their strong optical
nonlinearity derived from pi-electrons and the nonlinear
response time believed to be in femtosecond. We report
here the study of third-order nonlinear optical
interaction (X cube) in a polydiacetylene, poly 4 BCMU
by degenerate four wave mixing (DFWM).

DESCRIPTORS: (U) *OPTICAL PROCESSING, *ORGANIC MATERIALS,
POLYMERS, ACETYLENES, REPRINTS, INTERACTIONS, MIXING,
NONLINEAR SYSTEMS, POLYMERS, REACTION TIME, SIGNAL
PROCESSING, WAVES

IDENTIFIERS: (U) *Four Wave Mixing, *Nonlinear Optics,
Acetylene/Poly-4-BCMU Polyd; Ac etylene Polyd;
Picosecond Time, Femtosecond Time

AD-A173 054

DESCRIPTIVE NOTE: Final rept. 1 Oct 84 - 31 Dec 84

JAN 85   15P

PERSONAL AUTHORS: Boers, Michael W.

CONTRACT NO: AFOSR 85-0046

PROJECT NO: 2312

TASK NO: A5

MONITOR: AFOSR
TR-85-0832

UNCLASSIFIED REPORT

ABSTRACT: (U) The compound perfluoro-n decanoic acid
(PFDA) was exposed to three tissue culture cell lines,
BTK2 kidney, BRL buffalo rat liver, and K9 clone 9
rat liver, in concentrations up to 200 micrograms/ml for
24 hr time periods. The technique of fluorescence
recovery after photobleaching (FRAP) was used to examine
cell membrane fluidity, specifically with respect to the
membrane lipids. Results demonstrated that PFDA affects
the fluidity of both liver lines but not the kidney line.
Furthermore, differential sensitivity was observed
between the responsiveness of the two liver lines. BRL
was more sensitive than K9. The increased PFDA induced
membrane fluidity was transient, recovery occured by 48
hr following removal of the PFDA. The FRAP technique
appears useful in elucidating mechanisms of agent action
as well as elucidating mechanisms of agent action.

DESCRIPTORS: (U) *CELLS BIOLOGY, *KIDNEYS, *LIVER,
*FATTY ACIDS, DIFFERENTIAL CROSS SECTIONS, FLUIDS,
FLUORESCENCE, FLUORINATION, LIPIDS, MEMBRANES,
MEMBRANES BIOLOGY, RATS, RECOVERY, SENSITIVITY, TIME
INTERVALS, VISCOSITY, TISSUE CULTURE CELLS

IDENTIFIERS: (U) Decanoic Acid Perfluoro N

AD-A173 061

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A173 053   5   7 3   AD-A173 053   CONTINUED

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

IDENTIFIERS   (U) Deoxycholic acid

(U) Modification of Chemical Reactivity via Inclusion
    Complex Formation Photochemistry of Dibenzyl Ketones
    and Benzyl Phenylacetates.

86   5p

PERSONAL AUTHORS.   Rao Bantu N   Turro Nicholas J
    Ramamurthy V.dhyanathan

CONTRACT NO   AFOSR 84 0040

PROJECT NO   2302

TASK NO   B2

MONITOR   AFOSR
              TR 86 0993

            UNCLASSIFIED REPORT

ABSTRACT   (U)   In the context of employing inclusion
complexes as a medium for organic photochemical reactions,
we have investigated the photochemical behavior of
dibenzyl ketones and benzyl phenylacetates using
deoxycholic acid (DCA) channels as a and
cyclodextrin as hosts in the solid state Results on
cage effects suggest that the translational motion of the
benzyl radical pairs is restricted in all three media and
totally ... in compound. Products resulting from
rearrangement of dibenzyl ketone are formed upon
photolysis in DCA compound and cyclodextrin and were
shown in the cholic acid The absence of rearrangement
in DCA and the processes to correspondence in Diamin 6
compound and cyclodextrin is suggested to be an
indication of the restriction imposed by the host on the
conformations of geminate radical pairs

AD-A173 053

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

An Experimental Study of the Excited State Rotational
Population of OH in Flames using Laser Induced
Fluorescence.

86   13P

PERSONAL AUTHORS Zizak G   Lanauze J A   Winefordner J
D

CONTRACT NO   F49G20-84-C-0002

PROJECT NO   2303

TASK NO   A1

MONITOR   AFOSR
            TR-86-1011

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in Combustion and Flame v65 p203
214 1986.

ABSTRACT   U   Rotationally resolved fluorescence spectra
of OH in three different flames and for different
excitation levels have been measured and analyzed   The
extracted population distributions have been treated with
a simple model based of a steady state rate approach
Global parameters such as the ratio of rotational energy
transfer and average quenching and thermalization degree
have been measured for an exact analysis of the relative
population of individual levels, knowledge of the state
to state cross sections for collisional transfer and
numerical programs are needed   Keywords   Laser
Temperature Flame, Hydroxyl Radical, Diagnostics
Reprints

DESCRIPTORS   U   *FLAMES   *LASER INDUCED FLUORESCENCE
HYDROXYL RADICALS   THERMAL PROPERTIES ENERGY TRANSFER
QUENCHING INHIBITION   PARTICLE COLLISIONS
DIAGNOSIS, GENERAL   REPRINTS

IDENTIFIERS   U   RET Rotational Energy Transfer
PE61102F

AD A172 051

DTIC REPORT BIBLIOGRAPHY

AD A173 047   6/1   20/10   7/3   7/4

VANDERBILT UNIV NASHVILLE TN DEPT OF CHEMISTRY

(U) Quantum Theoretical Studies of Enzyme Inhibitors and Related Compounds.

DESCRIPTIVE NOTE: Final technical rept 1 Oct 82-15 May 86

JUL 86   32P

PERSONAL AUTHORS: Ewig Carl S ;Van Wazer John R

CONTRACT NO AFOSR 82 0100

PROJECT NO 2303

TASK NO B2

MONITOR AFOSR
TR 86-0937

UNCLASSIFIED REPORT

ABSTRACT (U) This final technical report summarizes research on application of ab initio quantum chemical techniques to enzyme inhibitors such as acetylcholinesterase. Computational techniques have been developed, tested and applied to 1) chemically related series of prototype and actual organophosphorus inhibitors, 2) prototype acetylcholine hydrolysis intermediates, 3) the pralidoxime or 2 PAM antidote, and 4) similar molecular systems as tests of the methods. properties obtained include detailed molecular structures and thermodynamics of elementary reaction steps.

DESCRIPTORS: (U) QUANTUM CHEMISTRY, ENZYME INHIBITORS, MOLECULAR STRUCTURE, THERMOCHEMISTRY, TEST METHODS, ORGANIC PHOSPHORUS COMPOUNDS, HYDROLYSIS, CHOLINESTERASE INHIBITORS, ACETYLCHOLINESTERASE, COMPUTATIONS, PROTOTYPES, ACETYLCHOLINE, ANTIDOTES

IDENTIFIERS: (U) PE611102F, WUAFOSR2302B2

AD A173 048   7/4

STATE UNIV OF NEW YORK AT BUFFALO AMHERST

(U) Vibrational Dephasing and Energy Relaxation of Admolecules by Phonons.

FEB 85   6P

PERSONAL AUTHORS: Hutchinson Michael ;George Thomas F

REPORT NO

CONTRACT NO F49620-86-C-0009 NSF

PROJECT NO

TASK NO

MONITOR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters. 21 Feb 86

ABSTRACT

DESCRIPTORS: COMPRESSOR BLADES, OSCILLATION, ROTATION, INCOMPRESSIBLE FLOW, AERODYNAMIC CHARACTERISTICS, IN-JETS, UNSTEADY FLOW, FLOW DISTORTION, PRESSURE DISTRIBUTION, VARIABLE PRESSURE, DYNAMIC RESPONSE, COMPRESSOR ROTORS, CASCADE STRUCTURES, MEASUREMENT, TEST FACILITIES, TEST METHODS, INSTRUMENTATION, MODEL TESTS, CONTROL SYSTEMS

IDENTIFIERS: Oscillating blade rows, Unsteady aerodynamics, Unsteady pressure distribution, Unsteady measurement techniques, surface flow, compressor aerodynamics, PE61102F, WUAFOSR2302B1

REPORT NO: AFOSR-TR-85-

CONTRACT NO:

SUPPLEMENTARY NOTE: See also Volume 2, AD-A173 044

ABSTRACT: An experiment was conducted on a heavily instrumented, isolated model compressor rotor to study the unsteady aerodynamic response of the blade row to a circumferential inlet flow distortion with respect to oscillating blades and to blade oscillation in an ...

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD A173 039   7/5   7/4

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Photosensitization by Reversible Electron Transfer:
Theories, Experimental Evidence, and Examples

DESCRIPTIVE NOTE: Rept. for 1984-1986.

85   80P

PERSONAL AUTHORS: Kavarnos George J. , Turro,Nicholas J .

CONTRACT NO   AFOSR 84-0040

PROJECT NO   2303

TASK NO   B2

MONITOR: AFOSR
·R 86 1028

UNCLASSIFIED REPORT

ABSTRACT   (U)   The subject of this review is electron
transfer between excited state and ground state molecules.
The discussion is limited to primary electron transfer
processes and not to secondary processes. Our objective
is to present a review of the developments by photochemists
who have been involved in the study of excited-state
photoinduced electron transfer over the last 15 years ...

AD A173 040   4/1   20/14

BOSTON COLL CHESTNUT HILL MA DEPT OF PHYSICS

(U) The Dynamic Ionosphere Over Arecibo: A Theoretical
Investigation

JAN 86   8P

PERSONAL AUTHORS: Sperry David J. , Forbes, Jeffrey M .

CONTRACT NO   AFOSR 81-0050

PROJECT NO   2310

TASK NO   A1

MONITOR: AFOSR
TR 86 1029

UNCLASSIFIED REPORT

ABSTRACT   (U)   Numerical simulations of the F region
ionosphere over Arecibo, Puerto Rico are presented. We ...

AD-A173 ???

AD A173 038   CONTINUED

PRINCETON UNIV. N.J. DEPT OF CHEMICAL ENGINEERING

IDENTIFIERS: (U) RAIS Reflection Absorption Infrared
Spectroscopy) PE61102F WUAFOSR2303A2

(U) The Isosteric Phase Transformation of the Ni(100)-c(5
square root of 2 x square root of 2 R45 deg CO Surface

86   8P

PERSONAL AUTHORS: Benziger Jay B   Schoofs Gregory R

CONTRACT NO   AFOSR 82 0302

PROJECT NO.   2303

TASK NO   A2

MONITOR   AFOSR
TR 86 1018

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub. in Surface Science v171 pL401-
L408 1986

ABSTRACT   (U)   A thermally activated isosteric phase
transformation of CO on Ni(100) was identified and
followed dynamically with temperature programmed
reflection absorption infrared spectroscopy (TPRAIS).
Carbon monoxide adsorbed to a coverage of 0.6 monolayers
on Ni(100) at 190K gives rise to a c(5 sq. rt.2) x (sq.
rt.2)R45 deg LEED pattern and an infrared spectrum
showing 2/3 of the molecules adsorbed in bridge sites and
1/3 of the molecules adsorbed in on top sites. Heating
the Ni crystal to 280 K results in little CO desorption
and the same LEED pattern is observed. However, the
infrared spectrum shows a reversal of the site occupancy
of CO after heating to 280 K so that 2/3 of the molecules
are in on top sites and 1/3 are in bridge sites. This
phase transformation was followed dynamically with TPRAIS
during temperature programming. The activation energy for
the phase transformation is approximately 64 kJ/mol. In
addition the adsorbed CO transfers from on top sites to
bridge sites at 400 K before desorbing at 415 K.

DESCRIPTORS: (U)   (INFRARED SPECTROSCOPY PHASE
TRANSFORMATIONS REFLECTION ABSORPTION SPECTRA CARBON
MONOXIDE ADSORPTION NICKEL VIBRATIONAL SPECTRA
THERMAL PROPERTIES REPRINTS

AD A173 038

DTIC REPORT BIBLIOGRAPHY

AD A173 017   20/6   9/5

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Picosecond Transient Grating Studies of Polymeric Thin Films

FEB 85   4P

PERSONAL AUTHORS: Rao D. V. ; Burzynski R. ; Prasad P. N.

REPORT NO CONF-AB-TR-2

CONTRACT NO F49620-85-C-0072 AFOSR-TR-86-...

PROJECT NO 2303

TASK NO A2

MONITOR AFOSR TR-86-0118

UNCLASSIFIED REPORT

AD A173 095   7/4

PRINCETON UNIV NJ DEPT OF CHEMICAL ENGINEERING

(U) Characterization of Platinum Electrodes by Infrared Spectroscopy.

85   17P

PERSONAL AUTHORS: Benziger Jay B. ; Pascal F. A. ; Bernasek S. L. ; Sorriaga M. P. ; Hubbard A. T. ;

CONTRACT NO N00014-82-K-0004, AFOSR-82-0302

PROJECT NO 2303

TASK NO A2

MONITOR AFOSR
TR-86-1016

UNCLASSIFIED REPORT

ABSTRACT (U) The surface of a Pt electrode has been examined as a function of applied potential with reflectance absorption infrared spectroscopy and linear sweep voltammetry. In 3.1 M HClO4 solution, absorbed ...

SEARCH CONTROL NO. EVN515

AD A173 033

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Degenerate Four Wave Mixing Study of Conformational
Transition of a Polydiacetylene, Poly-4 BCMU, in
Solution.

JUL 86   5P

PERSONAL AUTHORS: Cong,Peijun ;Pang,Yang ;Prasad,Paras N.

REPORT NO   SUNY/AB/TR-7

CONTRACT NO   F49620-85-C-0052

PROJECT NO   2303

TASK NO.   B3

MONITOR: AFOSR
            TR-86-0948

UNCLASSIFIED REPORT

ABSTRACT   (U)   A great deal of interest is currently
centered on polydiacetylenes because of their unique
electronic and nonlinear optical properties. One of the
polydiacetylenes, 5,7 dodecadiyn 1,12-bis (4-
butoxycarbonylmethylurethane) commonly abbreviated as
poly-4-BCMU, has been extensively studied because of its
visible color change from red to yellow under certain
conditions. e.g., in chloroform/hexane solution when the
molar fraction of CHCL3 varies from 0 to 1, or in toluene
solution when the temperature changes from 40 to 70C. The
pronounced color change has been attributed to a
conformational change from a rod (red) form to a coil
(yellow) form. The conformational change in the poly-4
BCMU polydiacetylene was investigated by using nanosecond
time-resolution degenerate four wave mixing. Polarization
data along with the time response of the signal to be
from a thermal grating. The degenerate four wave mixing
signal changes dramatically during the rod to coil
transition and fits a theoretical model of single chain
conformational transition.

AD A173 033

PAGE 196   EVN515

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A173 033   CONTINUED

DESCRIPTORS: (U), *POLYMERS, *ACETYLENES, *CHEMICAL
REACTIONS, *MOLECULAR STRUCTURE, BUTYL RADICALS, CARBONYL
COMPOUNDS, URETHANES, CHLOROFORM, COLORS,
GRATINGS(SPECTRA), HEXANES, MIXING, MODELS, NONLINEAR
SYSTEMS, OPTICAL PROPERTIES, POLARIZATION, REACTION TIME,
RED(COLOR), SOLUTIONS(GENERAL), THEORY, THERMAL
PROPERTIES, TOLUENES, VISIBLE SPECTRA, WAVES,
YELLOW(COLOR)

IDENTIFIERS: (U), Polyacetylenes, Urethane 4-Butoxy
Carbonyl Methyl, PE61102F, WUAFOSR2303B3

AD-A173 033

AD-A173 023   11/2

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF
MATERIALS SCIENCE AND ENGINEERING

(U) Surface Chemistry in Relation to the Strength and
Fracture of Silicate Glasses,

85   31P

PERSONAL AUTHORS: Pantano, C. G. ;

PROJECT NO.   2303

TASK NO.   A3

MONITOR: AFOSR
TR-86-0596

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Strength of Inorganic Glass
and Fracture of Silicate Glasses. p37-66 1985.

ABSTRACT: (U)   The chemical characteristics of silica and
multicomponent silicate glass surfaces are summarized
with an emphasis on those features which are expected to
influence strength behavior and fracture. The surface
composition, and any in-depth modification or surface
layer formation, are examined with modern surface
analysis techniques such as ion-scattering spectroscopy,
secondary ion mass spectroscopy and electron spectroscopy.
The effects of hydration reactions under ambient
conditions, and high temperature reactions under ambient
conditions, and high temperature reactions or surface
treatments during manufacture and processing are
specifically addressed. In addition, fundamental studies
of 'clean' or 'ideal' glass surfaces are used to describe
the intrinsic structure and chemical reactivity of the
surface species. Finally, an attempt is made to identify
any direct and fundamental relationships between these
surface chemical characteristics and the micromechanisms
of fracture.

DESCRIPTORS: (U), *FRACTURE(MECHANICS), *SILICATES,
*GLASS, *SILICA GLASS, CHEMICAL PROPERTIES, SILICON
DIOXIDE, HYDRATION, SURFACES, MODIFICATION, IONS, MASS
SPECTROSCOPY, SURFACE CHEMISTRY, CHEMICAL REACTIONS,
REACTIVITIES, ELECTRON SPECTROSCOPY, HIGH TEMPERATURE,
STRENGTH(MECHANICS), SCATTERING, SPECTROSCOPY, SURFACE

AD-A173 023   CONTINUED

AD-A173 012   7/4

ANALYSIS, LAYERS, SURFACE FINISHING, MASS SPECTROSCOPY

UREGON UNIV   EUGENE   DEPT OF CHEMISTRY

IDENTIFIERS: (U) (Silicate glass, Secondary Ion Mass
Spectroscopy, PE61102F WUAFOSR2303A3

(U) Rotational and Vibrational Spectra of Molecular
Clusters

DESCRIPTIVE NOTE: Final rept. 1 Nov 82-31 Mar 86

JUN 86   29P

PERSONAL AUTHORS: Dyke, Thomas R.

CONTRACT NO.   F49620-83-C-0007

PROJECT NO.   2303

TASK NO.   B1

MONITOR: AFOSR
TR-86-0925

UNCLASSIFIED REPORT

ABSTRACT: (U) This research project studies the
rotational and vibrational spectroscopy of hydrogen
bonded complexes and van der Waals molecules and develops
new techniques for gathering this information. The
purpose is to provide basic information for modelling the
effects of these molecules in atmospheric phenomena and
to achieve insights concerning the intermolecular forces
manifested in the weak bonds holding cluster molecules
together. Rotational spectra were investigated the
molecular beam electric resonance method. High resolution
radiofrequency and microwave spectra of complexes
observed by this technique give accurate rotational
constants, electric dipole moments, and nuclear hyperfine
interaction data which was used to provide structural
data. Methods were developed for observing vibrational
spectra of complexes in molecular beams using CARS, Raman
spectra were obtained for molecular beams of HCN and DCN
polymers in the CN and CH stretching regions. A force
field model for the axial modes of these molecules was
constructed by combining infrared and Raman data.
Infrared absorption spectra for molecular beams of rare
gas-OCS complexes on the au3 monomer mode region were
obtained using tunable diode lasers. The spectra are
rotationally resolved and the Doppler limited linewidths
(0.004 cm) show no evidence of vibrational
predissociation broadening.

AD-A173 023

AD-A173 012

PAGE   105   EVN5AB

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN543

AD-A173 012   CONTINUED

DESCRIPTORS: (U) *MOLECULAR COMPLEXES, *HYDROGEN BONDS,
*INFRARED SPECTROSCOPY, *RAMAN SPECTRA, MOLECULAR
ROTATION, MOLECULAR VIBRATION, MOLECULAR BEAMS, RESONANT
FREQUENCY, HYPERFINE STRUCTURE, ABSORPTION SPECTRA,
HYDROGEN PEROXIDE, HYDROGEN SULFIDE, AMMONIA, CARBON
DIOXIDE, MICROWAVE SPECTROSCOPY

IDENTIFIERS: (U) CARS(Coherent Antistokes Raman
Spectroscopy), van der walls forces, PE611025F,
WUAFOSR2303B1

AD-A173 011   20/3   7/3   11/9

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Third Order Nonlinear Optical Interactions in Thin
Films of Poly-p-Phenylenebenzobisthiazole Polymer
Investigated by Picosecond and Subpicosecond
Degenerate Four Wave Mixing.

MAY 86   4P

PERSONAL AUTHORS: Rao,D. N. ;Swiatkiewicz,Jacek ;Chopra,
Pratibha ;Ghoshal,Suniti K. ;Prasad,Paras N. ;

REPORT NO.   SUNY-AB/TR-4

CONTRACT NO.   F49620-85-C-0052, AFOSR-84-0281

PROJECT NO.   2303

TASK NO   B3

MONITOR: AFOSR
TR-86-0951

UNCLASSIFIED REPORT

ABSTRACT: (U)   The third order nonlinear optical
susceptibility has been measured by degenerate four wave
mixing in a 33-micrometer-thick biaxial film of a
conjugated aromatic heterocyclic polymer, poly-p-
phenylenebenzobisthiazole, commonly known as PBT, which
has a very high mechanical strength due to its rigid rod
conformation as well as environmental stability and a
high laser damage threshold. For the first time, the
response of the optical nonlinearity in the pi-electron
conjugated system has been experimentally verified to be
in subpicoseconds. The value of X superscript 3 is found
to be about an order of magnitude larger than that of CS2.
The measurement at two different wavelengths suggests
that they are nonresonant X subscript (3) values. The
measured anisotropy of X subscript (3) as a function of
angular orientation at two different sets of laser
polarization is explained by using the tensor properties
of X subscripts (3) in an anisotropic medium.

DESCRIPTORS: (U) *POLYMERIC FILMS, *OPTICAL PROPERTIES,

AD-A173 011

AD-A173 012

AD-A173 011   CONTINUED

AD-A173 010   11/9

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) Polysilanes as Photoinitiators for Vinyl
    Polymerization.

86   7P

PERSONAL AUTHORS: West,Robert ;Wolff,Andrew R. ;Peterson.
Donald J. ;

CONTRACT NO.   F49620-83-C-0044

PROJECT NO.   2310

TASK NO.   A2

MONITOR: AFOSR
            TR-86-0964

UNCLASSIFIED REPORT

ABSTRACT: (U)   The polysilane high polymers, more
correctly called polydioganosilylenes, are made by
condensing diorganodichlorosilanes with sodium metal.
They are linear polymer in which all of the atoms in the
polymer backbone are silicon atoms. Single
dichlorosilanes produce homopolymers, and mixtures of two
or more dichlorosilanes yield copolymers.

DESCRIPTORS: (U)   *POLYSILANES, *POLYMERIZATION, *VINYL
PLASTICS, ATOMS, COPOLYMERS, LINEAR SYSTEMS, METALS.
POLYMERS, SILICON, SODIUM, PHOTOLYSIS, SOLUBILITY,
ABSORPTION SPECTRA, OLEFIN POLYMERS

POLYPHENYLENES, THIAZOLES, MOLECULAR STRUCTURE,
ELECTRONIC STATES, ANGLES, ANISOTROPY, AROMATIC COMPOUNDS,
CONFORMITY, ENVIRONMENTS, HETEROCYCLIC COMPOUNDS, HIGH
STRENGTH, LASER DAMAGE, LASERS, MIXING, NONLINEAR SYSTEMS,
ORIENTATION(DIRECTION), POLARIZATION, POLYMERS, RIGIDITY,
RODS, STABILITY, STRENGTH(MECHANICS), THIN FILMS, WAVES,
REPRINTS

AD-A173 011

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A173 007   7/3

SAN DIEGO STATE UNIV CA DEPT OF CHEMISTRY

(U) Comparative Trapping Kinetics of SILYLENE. 1. Silylene
Reactions with 1,3-Butadiene and Acetylene and with
and with 1,3-butadiene and Menthanol

86   9P

PERSONAL AUTHORS: Rogers,D. S. ;O'Neal,H. E. ;Ring,M. A. ;

CONTRACT NO AFOSR-83-0209

PROJECT NO 2303

TASK NO. B2

MONITOR: AFOSR
TR-86-0997

UNCLASSIFIED REPORT

ABSTRACT: (U) Relative rate studies of silylene trapping
by butadiene, methanol, and acetylene are reported. For
the reactions :SiH2 + H2C=CHC(H)=CH2 yields CH2C4H6
-CH(H2SiH2 vs. :SiH2 + CH2OH yields CH3OSiH3 in (k sub 3
k sub 7) -5.91 + or - 0.91 -5846 + or - 1540 cal/RT
:696 1016 K), and reaction 3 vs. :SiH2 + HC triple bond
CH yields HC=CSiH3 in (k sub 3/k sub 6) = -1.51 + or - 0
321 (712 + or - 520) cal/RT (603-102 K). Relative rates,
extrapolated to room temperature, are favorably compared
to existing absolute rate constant measurements. On the
basis of estimated Arrhenius parameters for the reaction
7, tentative absolute Arrhenius parameters with
temperature dependencies for a number of silylene
substrate reactions are calculated. keywords.
Methoxysilane, ethynylsilane, silacyclopentene.

DESCRIPTORS: (U) ACETYLENE, *CARBINOLS, *SILICON
COMPOUNDS, *BUTADIENES, ARRHENIUS EQUATION, CONSTANTS
PARAMETERS, RATES, REACTANTS,CHEMISTRY, SILANES,
MEASUREMENT, REPRINTS

IDENTIFIERS (U) *Silylenes, PE61102F, WUAFOSR2303B2

AD-A173 007

AD-A173 009   7/4

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

(U) Glow Discharge Source Atomization for the Laser
Excited Atomic Fluorescence Spectrometric Studies of
Iridium

86   7P

PERSONAL AUTHORS Patel,B. M. ;Winefordner,J. D. ;

CONTRACT NO F49620-84-C-0002

PROJECT NO 2303

TASK NO A1

MONITOR AFOSR
TR-86-1010

UNCLASSIFIED REPORT

ABSTRACT (U) A demountable glow discharge source has
been used for the atomization of the analyte solutions
deposited on graphite and copper rod cathodes. Indium
ions are sputtered atomized from the cathode surface and
are excited by a pulsed, frequency doubled dye laser
pumped by the nitrogen laser. Atomic fluorescence
measurements were performed using the 3-0 resonance
fluorescence transitions. The detection limits of Indium
aqueous solutions (10 ug deposited on graphite and
copper electrodes are 0.00000008 and 0.000004 g
respectively (2 ng and 11 ng)

DESCRIPTORS (U) *GLOW DISCHARGES, *IRIDIUM, *LASER
INDUCED FLUORESCENCE, ATOMIZATION, COPPER, ELECTRODES,
DEPOSITION, GRAPHITE, SOLUTIONS,MIXTURES, WATER,
GRAPHITE CATHODES, SURFACES, RODS, DYE LASERS, FREQUENCY
MULTIPLIERS, LASER PUMPING, GLOW DISCHARGES, SOURCES,
ATOMS, NITROGEN LASERS, SPUTTERING, REPRINTS, REPRINTS

IDENTIFIERS (U) PE61102F, WUAFOSR2303A1

AD-A173 009

AD-A173 006

AD-A173 006   CONTINUED

PARTICLE COLLISIONS, PHOTODISSOCIATION, BROMINE, BORON, HELIUM, MOLECULAR BEAMS, MOLECULAR VIBRATION, REPRINTS

ILLINOIS INST OF TECH CHICAGO DEPT OF CHEMISTRY

(U) Rate Constants for Collisional Deactivation of Br2 (B 3) II Ou by Br2 X and He

    86   11P

PERSONAL AUTHORS: VAN DE Burgt L. J .Heaven M. C.

MONITOR: AFOSR   TR-86-0995

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in Chemical Physics, v103 p407-416 1986.

ABSTRACT   (U)   Electronic self-quenching of Br2 (B) was investigated in the gas phase. The molecules were excited to individual rovibrational levels by a pulsed dye laser, and the fluorescence decay monitored in real time. Negatively curved Stern-Volmer plots were obtained for low J levels (v15) of v=7, 11, and 14, and these were interpreted in terms of a deactivation mechanism involving collisional energy transfer to predissociated levels. The Stern-Volmer plots and resolved fluorescence data have been analyzed using detailed kinetic model of the quenching, energy transfer, and predissociation occurring within a collisionally coupled set of rovibrational levels. The model provided rate constants for quenching (4 2 + or - 0 5)X10 to the power cc molecule s rotational energy transfer 6 + or - 2 X10 to the power cc molecules s, and indirect evidence for efficient near resonant vibrational energy transfer (V-R, T). Electronic quenching of Br2(B) by He was also investigated. Previous studies gave rate constants of approx x 0 to the -10 power CC molecule s, but in the present work it was found that the deactivation is entirely a consequence of energy transfer to predissociated levels. An upper limit of k sub 0 = 2x10 to the -12 power CC molecule s was determined. Keywords Lasing Kinetics

DESCRIPTORS   (U)   COLLISIONS, CONSTANTS, COUPLING(INTERACTION), DEACTIVATION, DECAY, DYE LASERS, ENERGY TRANSFER, GASES, KINETICS, MODELS, POWER, PULSED LASERS, RATES, REAL TIME, RESONANCE, LASER INDUCED FLUORESCENCE, ELECTRONIC STATES, QUENCHING(INHIBITION)

AD-A173 006

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 995   6/3   5/10

SRI INTERNATIONAL MENLO PARK CA LIFE SCIENCES DIV

(U) Neurophysiological Bases of Event-Related Potentials.

DESCRIPTIVE NOTE: Annual rept. no. 4, 1 May 85-30 Apr 86.

AUG 86   66P

PERSONAL AUTHORS: Rebert, Charles S. :

CONTRACT NO. F49620-82-K-0016

PROJECT NO. 2313

TASK NO. A4

MONITOR: AFOSR
TR-86-0910

UNCLASSIFIED REPORT

ABSTRACT: (U)   In order to more fully understand the physiological and psychological significance of event-related brain potentials, cortical and subcortical recordings were obtained from monkeys performing an operant conditioning task (cued reaction time). During the past year three cynomolgus monkeys were studied following the administration of MPTP, a drug that selectively destroys nigra-striatal dopaminergic neurons in the pars compacta of the substantia nigra. This manipulation indicated the cortical role of the nigra-striatal dopamine for task performance enhancement would be to determine if increasing nigra striatal dopaminergic activity would enhance performance and electrophysiological responsivity. Keywords: Subcortical; Nuclei; Biocybernetics; Cognition; Reaction time.

DESCRIPTORS: (U)   *NEUROPHYSIOLOGY,
*ELECTROENCEPHALOGRAPHY, ELECTROPHYSIOLOGY, CEREBRAL CORTEX, CONDITIONED RESPONSE, PHARMACOLOGICAL ANTAGONISTS, DOPAMINE, NUCLEI, BRAIN, COGNITION, CYBERNETICS, JOBS, MONKEYS, OPTIMIZATION, PERFORMANCE(HUMAN), POTENTIAL THEORY, REACTION TIME

IDENTIFIERS: (U) *Event Related Potentials, LPH SRU 4373.
WUAFOSR213A4, PE61102F

AD-A172 995

AD-A172 996   20/5

BERKELEY RESEARCH ASSOCIATES INC CA

(U) Free Electron Laser Theory

DESCRIPTIVE NOTE: Final rept. no 4, 1 May 85-30 Apr 86

JUL 86   98P

PERSONAL AUTHORS: Colson W B

REPORT NO. BRA-86-313R

CONTRACT NO. F49620-85-C-0087

PROJECT NO. 2301

TASK NO. A1

MONITOR: AFOSR
TR-86-0912

UNCLASSIFIED REPORT

ABSTRACT: (U)   Free electron laser (FEL) theory is extended to explain several effects associated with high gain operation for the trapped particle instability is required for short pulses FELs. FEL oscillators, and FEL amplifiers. A new FEL theory exactly includes the effect of an arbitrary electron distribution function and an envelope function is given for optical spiking. Keywords: Free electron lasers; Trapped particles; Instability; Laser oscillators; Laser amplifiers; Gain; Wiggler particle.

DESCRIPTORS: (U)   *FREE ELECTRON LASER,
*AMPLIFIERS, *OSCILLATORS, *TRAPPED PARTICLES,
*STABILITY, PULSED LASERS, SHORT, BEAM FORMING,
LASER BEAMS, GAIN

IDENTIFIERS: (U) Laser oscillators, Wiggler magnets,
WUAFOSR2301A1, PE61102F

AD-A172 996

SEARCH CONTROL NO.   EVN548

AD-A172 980   CONTINUED

the zeros of the Brownian motion velocity may be obtained
This program will later focus on measurements of
particles of known size suspended in liquids in order to
maximize the signal to noise of the optical measuring
system, to refine the data acquisition methods, and to
verify the theoretical understandin of the acquired
signal. Followign the demonstration of the experimental
approach, the technique will be applied to measurements
of submicron particles suspended in gas flows.

DESCRIPTORS: (U) *BROWNIAN MOTION, *LIGHT SCATTERING,
*LASER BEAMS, *COMBUSTION, PARTICLE SIZE, SOOT, LASER
VELOCIMETERS, DOPPLER EFFECT, RAYLEIGH SCATTERING,
REFRACTIVE INDEX, MONTE CARLO METHOD, SIMULATION

IDENTIFIERS (U) Submicron size, WUAFOSR2308A2, PE61102F

AD-A172 980

AERODYNE RESEARCH INC, BILLERICA MA

(U) Study of Submicron Particle Size Distributions by
Laser Doppler Measurement of Brownian Motion

DESCRIPTIVE NOTE: Annual technical rept. 1 Sep 84-30 Sep
85

FEB 86   36P

PERSONAL AUTHORS: McCurdy,Keith F. ; Stanton,Alan C. ;
Cheng,Wai K. ;

REPORT NO. ARI-RR-504

CONTRACT NO F49620-85-C-0154

PROJECT NO 2308

T SK NO A3

MONITOR AFOSR
         TR-86-0873

UNCLASSIFIED REPORT

ABSTRACT (U) Few nonintrusive techniques are available
for particle measurement in the submicron size range (< o
1 micron diameter) yet measurement of these particles is
basic to an understanding of important processes in
combustion such as soot formation and oxidation. The
objective of the present research is the development and
application of a technique for measurement of individual
submicron particles in a gas stream. The approach is to
measure the inertial relaxation time of individual
particles of Brownian motion, by statistical analysis of
the time resolved 100 MHz heterodyne signal obtained in
an interferometer system resembling a more conventional
laser Doppler velocimeter. Progress to date has included
the development and refinement of an optical system for
conducting the experimental studies. This optical system
and experimental method are described in detail in
conjunction with preliminary measurement of H2O particles
which confirm the laser Doppler velocimeter mode of
operation of the apparatus. A theory describing the
statistical behavior of the signal from such a
measurement signal has been developed from theory, the
probability distribution for the time intervals between

AD-A172 980

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 973   21/2   21/5   AD-A172 973   CONTINUED

CALIFORNIA UNIV IRVINE COMBUSTION LAB   interests in complex flows.

(U) Mechanisms of Exhaust Pollutants and Plume Formation
     in Continuous Combustion.

DESCRIPTIVE NOTE   Final rept. May 83-Jul 84.

NOV 84   58P

PERSONAL AUTHORS   Samuelsen, G. S.

REPORT NO   UCI ARTR 84-18

CONTRACT NO   AFOSR-84-0202

PROJECT NO   2308

TASK NO   A2

MONITOR   AFOSR
           TR-86-0883

DESCRIPTORS   (U) *COMBUSTORS, *FUEL SPRAYS, GAS TURBINES,
RAMJET ENGINES, JET ENGINE FUELS, FUEL NOZZLES, DROPS,
SIZES(DIMENSIONS), STABILIZATION, FLOW, MEASUREMENT,
LASER BEAMS

IDENTIFIERS   (U) *Swirl stabilized combustors.
WUAFOSR2308A2, PE61102F

UNCLASSIFIED REPORT

ABSTRACT   (U)   The goal of the present grant was to
develop laboratory model combustors and experimental
methodology suitable for the acquisition of the desired
information. In a previous grant, a premixed
laboratory combustor, the Opposed Jet Combustor was
developed and validated. It has been used in both a
gaseous non-reacting and reacting system as well as a
non-reacting water system. In addition, a non-premixed
model swirl stabilized laboratory combustor, the Dilute
Swirl Combustor (DSC) was developed, tested, and
has been established for non-reacting as well as
reacting gaseous-fired conditions. The present grant was
directed to operating the DSC on liquid fuel and liquid
fuels, to establishing a droplet sizing capability that
would hold over the five year duration of the grant to
in situ measurements of drop size and drop velocity as
well as gas velocity within the DSC and to the study of
turbulent transport in swirl stabilized liquid fuel
spray atomized reacting flows. In particular, the
objectives of the program were ... to develop and verify
capability to conduct in situ measurements of droplet
size, velocity; 2 to operate the DSC with a liquid
fuel atomized with liquid nozzle; and 3 to conduct
a fundamental study in support of air force laboratory

AD-A172 973

AD-A172 973

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NU EVN54B

AD A172 967   9 4   12 1

ARIZONA UNIV TUCSON OPTICAL SCIENCES CENTER

(U) Optical Processing in Radon Space

DESCRIPTIVE NOTE   Final rept Jul 84 Jan 86.

JUN 86   113P

PERSONAL AUTHORS   Barrett,Harrison H

CONTRACT NO   AFOSR-84-0188

PROJECT NO   2305

TASK NO.   B1

MONITOR   AFOSR
TR 86-0916

UNCLASSIFIED REPORT

AD A172 967   CONTINUED

processing 3D data in Radon space concentrated primarily
on analysis of prospective materials for wavelength-
multiplexed mass-data storage

DESCRIPTORS: (U) *OPTICAL PROCESSING, *SIGNAL PROCESSING.
SPECTRUM ANALYSIS. IMAGE PROCESSING, MATHEMATICAL FILTERS.
TWO DIMENSIONAL. THREE DIMENSIONAL. FOURIER
TRANSFORMATION. SURFACE ACOUSTIC WAVE DEVICES. REGRESSION
ANALYSIS

IDENTIFIERS: (U) *Radon transformation, Radon space.
Wigner distribution functions. Hartley transformation.
Yule Walker model. WUAFOSR2305B1. PE61102F

ABSTRACT: (U)   The stated goals of the program were:
Theoretical investigation of the role of the Radon
transform in signal processing, including enumeration of
the operations achievable in Radon space Construction of
a practical system for 2D spectral analysis and image
filtering proof of principle experiments for other
processing operations, such as bandwidth compression and
calculation of the Wigner distribution function; and
Determination of the feasibility of Radon-space
processing 3D data, emphasizing not only system
architecture but also storage media capable of saving and
rapidly retrieving the requisite data arrays. Several 2D
signal-processing operations susceptible to solution in
radon space These include the Hartley transform, certain
joint coordinate-frequency representations (e.g., the
Wigner distribution function and Woodward ambiguity
function) certain algorithms for spectrum estimation (e
g., the periodogram and the Yule Walker autoregressive
model), and the cepstrum Most of these Radon space
operations have been demonstrated in computer simulations
and some have been performed by means of analog hardware
in the hybrid Radon space signal processing system This
system can perform a family of processing operations at
about five frames per second, limited by the image
rotation rate. Processing is performed by surface
acoustic wave (SAW) filters, and the 2D processed signal
is displayed on a CRT Studies of the feasibility of

AD A172 967

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVN54B

AD-A172 966   13 13   AD A172 966   CONTINUED

TEXAS A AND M UNIV COLLEGE STATION I MECHANICS AND   DESCRIPTORS   (U)   *STRUCTURAL RESPONSE, *THERMOMECHANICS,
MATERIALS CENTER   SPACE SYSTEMS, STRUCTURES

(U) A Model for Predicting Thermomechanical Response of   IDENTIFIERS   (U) Large space structures, WUAFOSR2303KI,
     Large Space Structures   PE61102F

DESCRIPTIVE NOTE   Final technical rept Apr 83 May 86

    JUL 86   286P

PERSONAL AUTHORS   Allen, D H   Haisler, W E

REPORT NO   MM 4875 86 16

CONTRACT NO   F49620-83-C-0067

PROJECT NO   2303

TASK NO   K1

MONITOR   AFOSR
           TR 86 0684

ABSTRACT   (U)   Contents   Research Completed Summary of
Completed Research Literature Survey Selection of
Constitutive Equations Coupled Energy Balance Law Space
Structural Response Algorithms Mean Results for Large
Space Structures Publications List Appendix Interim
Technical Reports A Prediction of Heat Generation in a
Thermo-viscoplastic Uniaxial Bar Definitions and
Accuracy Alternative to Subincrementation for Elastic-
plastic Analysis by the Finite Element Method Predicted
Axial Temperature Gradient in A viscoplastic Uniaxial Bar
Due to Thermomechanical Coupling Experimental Temperature
Field in a Thermomechanically Heated Elastic plastic Space
Truss Structure Effect of Degradation of Material
Properties on the Dynamic Response of Large Space
Structures A Fractographic Study of Damage Mechanisms in
Short Fiber Metal Matrix Composites Analytical and
Numerical Solution of a Time Dependent Thermoviscoplastic
Problem in Mechanics A Finite Element Model for the
Thermoelastic Analysis of Large Composite Space
Structures Predicted Dynamic Response of a Composite
Beam with Temperature Dependent and Spatially Variable
properties

AD A172 945

AD A172 945   CONTINUED

TORONTO UNIV. DOWNSVIEW ONTARIO INST. FOR AEROSPACE
STUDIES

(U) The Application of Laser Saturation to the Efficient
    Generation of Short Wavelength Radiation from Plasmas

DESCRIPTIVE NOTE: Final rept. 1 Nov 84-31 Oct 85

MAY 86   136P

PERSONAL AUTHORS: Measures, R. M.;

CONTRACT NO.   AFOSR 85-C020

PROJECT NO.   2301

TASK NO   A8

MONITOR   AFOSR
            TR 86 0906

            UNCLASSIFIED REPORT

DESCRIPTORS: (U) *LASER PUMPING, *COMPUTER PROGRAMS,
*PLASMAS PHYSICS, SODIUM, ELECTRON DENSITY, TEMPERATURE,
SATURATION, FREE ELECTRONS, THREE DIMENSIONAL,
EXPERIMENTAL DATA, PHOTONS, STRONTIUM

IDENTIFIERS: (U) LIBORS computer program, LIBORS, Laser
Ionization Based on Resonance Saturation, PE61102F,
WUAFOSR2301A8

ABSTRACT (U) Resonant laser pumping of transitions
within atoms or ions represents a powerful mode of
coupling laser energy into a gas or plasma. In the case
of laser saturation of a resonance transition rapid
heating of the free electrons by superelastic collision
quenching of the laser pumped state has been shown to
play the central role in this process. We have developed
a computer code that models this laser ionization based
on resonance saturation (LIBORS) and permits us to map
the three dimensional nature of this complex interaction
We have been able to show by comparison with experiment
that this LIBORS computer code can predict the radial and
axial electron density and temperature profiles of the
plasma formed along the path of the laser pulse. These
experimental results in themselves represent the first
detailed measurements of a sodium plasma created by laser
resonance saturation and reveal the importance of laser
attenuation in the formation of the plasma. We have also
shown that both one and two photon resonant laser pumping
of a cold, unexcited plasma created by two photon
ionization of strontium vapor can lead to rapid
excitation of high lying states of the strontium ion.
Lastly we have demonstrated parametric generation within
this same strontium plasma when the laser is tuned close
to a two photon transition of the ion

AD A172 945

UNCLASSIFIED

DTIC REPORT BIBLIOGRAPHY

AD A172 944   7 1   20 12   20 5

AD-A172 944   CONTINUED

MATERIALS RESEARCH SOCIETY UNIVERSITY PARK PA

(U) Laser-Controlled Chemical Processing of Surfaces
Symposium Held on November 1983 in Boston
Massachusetts. U S A

analysis of deposition and etching processes. In the
sixth section, we include processes that are not easily
classified within the preceding sections. A final section
covers papers that are mainly analytic.

DESCRIPTIVE NOTE   Final rept   1 Nov 83 31 Jul 84

JUL 84   423P

DESCRIPTORS   (U)   *SURFACE FINISHING. *CHEMICAL
ENGINEERING, *LASER APPLICATIONS. FILMS. VAPOR DEPOSITION,
ETCHING. DOPING. SOLIDS. PYROLYSIS. PHOTOCHEMICAL
REACTIONS. ELECTROCHEMISTRY. METHODOLOGY

PERSONAL AUTHORS   Johnson A W   Ehrlich Daniel J
Schlossberg Howard R

IDENTIFIERS   (U)   PE61102F. WUAFOSR2301A1

CONTRACT NO   AFOSR-84 0046

PROJECT NO   2301

TASK NO   A1

MONITOR   AFOSR
TR 86 1064

SUPPLEMENTARY NOTE   Proceedings of the Materials Research
Society Symposia   Volume 29

ABSTRACT   (U)   On the dates of the 14th to the16th of
November 1983 as part of its annual meeting in Boston.
MA. the Materials Research society sponsored a symposium.
Laser Controlled Chemical Processing of Surfaces The
symposium was the Second Annual MRS event organized
around the evolving field of materials processing by
chemistry induced with laser radiation This a field
which is rapidly expanding to include a diverse variety
of methods of activating or confining reaction for film
deposition etching or doping of solid surfaces. The
volume is organized according to the main topic areas of
the symposium The first section is devoted to laser
chemical vapor deposition reactions. driven thermally by
pyrolysis or by dominantly thermal surface treatment
This includes reactions. variously termed LCVD and laser
pyrolytic A second section is structured around
primarily photochemical or non thermal photo deposition
reactions   Electrochemistry driven by lasers is covered
in the third section The fourth section covers dry
etching processes only A fifth section includes papers
from the e............ applications of laser methods, for

AD-A172 937   AD A172 937   CONTINUED

TUFTS UNIV MEDFORD MA DEPT OF PHYSICS AND ASTRONOMY

(U) Narrow Band Slowly Varying Decimetric Radiation from
     the Dwarf M Flare Star YZ Canis Minoris

MAR 86   8P

PERSONAL AUTHORS   Lang Kenneth R   ,Willson,Robert F   ;

CONTRACT NO   AFOSR 83-0019

PROJECT NO   2311

TASK NO   A1

MONITOR   AFOSR
            TR 86 0985

        UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in Astrophysical Jnl , v302 n1
pt2 pL17-L21 1 Mar 86

ABSTRACT   (U)   Narrow-band slowly varying microwave
radiation has been detected from the dwarf M star YZ
Canis Minoris at frequencies near 1465 MHz. This
quiescent, or nonflaring, emission cannot be attributed
to gyroresonant radiation from coronal loops; the loops
would have to be more than 200 times the stellar radius
in size with magnetic field strengths of $H > or = 100$ G
at this distance. The narrow-band structure ($Delta nu/nu$
$> or = 0.1$) of the slowly varying radiation cannot be
explained by continuum emission processes Our
observations may be explained by coherent burst
mechanisms like electron-cyclotron masers or coherent
plasma radiation Maser action at the second harmonic of
the gyrofrequency implies a longitudinal magnetic field
strength of 250 G and an electron density of N sub e =
approx 6×10^{10} the ninth power/cc. Coherent plasma
radiation at the second harmonic of the plasma frequency
similarly requires N sub e = approx 6×10 to the ninth
power/cc but a longitudinal magnetic field strength of H
sub L $<$ 250 G The slow variation of the narrow-band
emission might be explained by the stochastic nature of
continued low-level. coherent burst activity There are
possible analogies with narrow-band decimetric bursts
observed on the Sun

AD-A172 937

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DTIC REPORT BIBLIOGRAPHY

AD-A172 936   7/3   7/4

ARIZONA UNIV TUCSON CARL S MARVEL LABS OF CHEMISTRY

(U) Polymerization of 1-Bromo-2-Phenylacetylene.

86   9P

PERSONAL AUTHORS: Trumbo,D. L. ;Marvel,C S

CONTRACT NO.   AFOSR-82-0007

PROJECT NO.   2304

TASK NO.   A6

MONITOR: AFOSR TR-86-1022

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Polymer Science: Part A Polymer Chemistry, v24 p759-766 1986.

ABSTRACT: (U) The title monomer was polymerized by thermal initiation and the polymers were analyzed by IR, NMR and GPC. The polymers were found to be low molecular weight species that had eliminated bromine as the polymerization progressed. In addition, initiation with AIBN was attempted; however, no difference in rate of polymerization, percent conversion or molecular weight was noted between these polymers and those synthesized by thermal initiation. Also, no initiator fragments were found in the polymers.

DESCRIPTORS: (U) *POLYMERIZATION, *ACETYLENE, *PHENYL RADICALS, *BROMINE, POLYMERS, INFRARED SPECTROSCOPY, NUCLEAR MAGNETIC RESONANCE, GAS CHROMATOGRAPHY, MOLECULAR WEIGHT, REPRINTS

IDENTIFIERS: (U) PE61102F, WUAFOSR2304A6

AD-A172 935   7/4   14/5

PITTSBURGH UNIV PA SURFACE SCIENCE CENTER

(U) An Enhanced Electron-Stimulated-Desorption Ion Angular Distribution Method for Imaging Molecular Orientations of Adsorbed Species.

JUN 86   6P

PERSONAL AUTHORS: Dresser,M. J. ;Alvey,M. D. ;Yates,J. T. , Jr.

CONTRACT NO.   AFOSR-82-013

PROJECT NO.   2301

TASK NO.   A7

MONITOR: AFOSR TR-86-1023

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Vacuum Science and Technology A, v4 n3 p1446-1450 May/Jun 86.

ABSTRACT: (U) A striking improvement has been made in quality of positive ion angular distribution data obtained in electron-stimulated desorption ion angular distribution (ESDIAD). The improved method has been used to study configurational changes in chemisorbed CO on Ni(110) which are induced by intermolecular interactions at high coverage. CO molecules adsorbed with normal C-O bond orientations on ridge Ni sites tilt away from the normal by ± 19 in directions perpendicular to the ridges for CO coverages above 0.75 CO/Ni. Evidence for the C-O tilting has also been studied as a function of electron energy. This has demonstrated that an O(1s) excitation process leads to intense and sharp O = ESDIAD beams. The improved ESDIAD method involves the removal of a soft x-ray background signal which originates from electron impact on the metal surface, and is therefore present in all photographic ESDIAD measurements made to date. The angular distribution of electron energy and current density, independent of the background effect is resultant pure ESDIAD patterns show more quantitative details in high and low signal regions than has been seen before.

AD A172 936

AD A172 935

PAGE   119   EVN54B

AD-A172 934   21/2

CALIFORNIA UNIV BERKELEY DEPT OF MECHANICAL ENGINEERING

(U) Application of Rayleigh Scattering to Turbulent Flow
with Heat Transfer and Combustion.

DESCRIPTIVE NOTE: Final rept. 1 May 85-30 Apr 86,

JUN 86   10P

PERSONAL AUTHORS: Talbot,L. .

CONTRACT NO. AFOSR-84-0124

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR
TR-86-0881

UNCLASSIFIED REPORT

ABSTRACT: (U) Studies of premixed turbulent v-shaped
flames have been carried out using two-point Rayleigh
scattering. Density fluctuation intensities, two-point
density covariances, and mean density profiles were found
to be in good agreement with a wrinkled laminar flame
model which is an extension of the Bray-Moss-Libby model.
The probability density function for the location of the
flame brush was measured and found to have a self-similar
behavior when scaled with the maximum slope thickness. A
new optical technique was developed to make time-resolved
Rayleigh scattering measurements along a length of a
laser beam, thus extending the two-point technique to a
multipoint one. The technique has been applied to the
investigation of the dynamics of v-shaped premixed
turbulent flames. Some of the findings are that incident
turbulence controls flame motion in the frequency range
100-100 Hz, and that an increase in heat release for a
given incident turbulence intensity increases the
amplitude of the flame fluctuations without modifying
their spectral characteristics.

DESCRIPTORS: (U) *FLAMES, *TURBULENCE, SHEETS, RAYLEIGH
SCATTERING, LASER BEAMS, MIXING, DENSITY, COVARIANCE,
PROBABILITY DENSITY FUNCTIONS

IDENTIFIERS: (U) Premixed turbulent flame structure, lvc

AD-A172 934

AD-A172 935   CONTINUED

DESCRIPTORS: U   *SURFACE CHEMISTRY, *MOLECULAR
PROPERTIES, *ADSORPTION, *PHOTOGRAPHY ELECTRONS,
STIMULATION(GENERAL, CATIONS, DISTRIBUTION
CHEMISORPTION, CARBON MONOXIDE, ORIENTATION(DIRECTION),
MOLECULE MOLECULE INTERACTIONS, NICKEL, REPRINTS

IDENTIFIERS: (U) ESDIAD(Electron Stimulation Desorption
Ion Angular Distribution), PE61102F, WUAFOSR2301A7

AD-A172 935

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A172 934   CONTINUED

AD-A172 923   20/12

IOWA STATE UNIV AMES

(U) Synthesis and Characterization of Thin Films.

DESCRIPTIVE NOTE: Annual rept. 1 Sep 84-30 Nov 85.

JUL 86   26P

PERSONAL AUTHORS: Lakin, K. M. ;

CONTRACT NO. AFOSR-84-0388

PROJECT NO. 2306

TASK NO. B2

MONITOR: AFOSR
TR-86-0859

UNCLASSIFIED REPORT

ABSTRACT: (U) During this one year period the
installation of a single source ionized cluster team (ICB)
deposition system was completed, a three source ICB
system was designed and purchased, the LiNbO3 thin film
and ellipsometry projects neared completion

DESCRIPTORS: (U) *THIN FILMS, *LITHIUM NIOBATES, *VACUUM
DEPOSITION, SPUTTERING, ION BEAMS, CLUSTERING, ULTRAHIGH
VACUUM, ELLIPSOMETERS, MONITORING

IDENTIFIERS: (U) ICB(Ionized Cluster Beams),
WUAFOSR2306B2, PE61102F

point Rayleigh scattering, Laminar flame model, Turbulent
flame brush, PE61102F, WUAFOSR2303A2

AD-A172 923

AD-A172 934

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A172 922   1/3

MASSACHUSETTS INST OF TECH CAMBRIDGE TECHNOLOGY LAB FOR ADVANCED COMPOSITES

(U) Dynamics and Aeroelasticity of Composite Structures.

DESCRIPTIVE NOTE: Final rept. 1 May 84-30 Jun 85.

MAR 86   30P

PERSONAL AUTHORS: Dugundji,John ;Chen,Gun-Shing ;

REPORT NO. TELAC-85-25

CONTRACT NO. AFOSR-84-0142

PROJECT NO. 2302

TASK NO. B1

MONITOR: AFOSR TR-86-0892

UNCLASSIFIED REPORT

ABSTRACT: (U) An analytical and experimental investigation was made of the aeroelastic flutter and divergence behavior of graphite/epoxy forward swept wings with rigid body pitch and plunge freedoms present. A complete, two-sided 30-degree forward swept wing aircraft model was constructed and mounted with low friction bearing in a low speed wind tunnel. Four different ply layup wings could be interchanged on the model. Wind tunnel tests on the free flying models revealed body freedom flutter, bending torsion flutter, and a support dynamic instability which could be eliminated by proper adjustment of the support stiffness. Good agreement with linear theory was found for the observed instabilities.

DESCRIPTORS: (U) ;SWEPTFORWARD WINGS, EPOXY COMPOSITES, GRAPHITED MATERIALS, AEROELASTICITY, FLUTTER, MODEL TESTS

IDENTIFIERS: (U) Divergence, WUAFOSR2302B1, PE61102F

AD-A172 904   21/2   20/4   21/1

MASSACHUSETTS INST OF TECH CAMBRIDGE

(U) Basic Instability Mechanisms in Chemically Reacting Subsonic and Supersonic Flows.

DESCRIPTIVE NOTE: Annual rept. 30 Sep 84-29 Sep 85.

OCT 85   28P

PERSONAL AUTHORS: Toong,Tau-Yi ;

CONTRACT NO. AFOSR-83-0373

PROJECT NO. 2308

TASK NO. A2

MONITOR: AFOSR TR-86-0887

UNCLASSIFIED REPORT

ABSTRACT: (U) Both theoretical and experimental studies were conducted to determine and elucidate major mechanisms governing turbulence-combustion interactions. The theoretical study showed the importance of wrinkling-like effects as well as the effects of the chemical reaction rate on the evolution of fluctuations in streamwise- and transverse-velocity, temperature, concentration, and vorticity in a shear layer. The wrinkling-like effects were induced by the transverse-velocity fluctuations in nonuniform mean flows. The direct rate-augmentation effects due to reaction led to changes in phase relationships between the various fluctuations, resulting in turbulent energy and mass transport in a direction opposite to that suggested by the gradient model in that part of the shear layer nearer the unreacted region. The experimental study showed the effects of adding ethane (at the same overall equivalence ratio) on the thermal structure of methane/air flames. Temperature fluctuations were augmented by ethane addition, the highest augmentation being observed at 10% ethane addition. A one-component Laser-Doppler velocimetry system was installed and tested

DESCRIPTORS: (U) ;COMBUSTION ,TURBULENCE FLAME PROPAGATION, SUBSONIC FLOW SUPERSONIC FLOW COMBUSTION STABILIT INTERACTIONS REACTION KINETICS CHEMICAL

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A172 904   CONTINUED

REACTIONS. SHEAR PROPERTIES. TEMPERATURE.
CONCENTRATION(CHEMISTRY). VORTICES. MASS TRANSFER.
ETHANES. FLAMES. VELOCIMETERS

AD-A172 903   20/4

TORONTO UNIV DOWNSVIEW (ONTARIO) INST FOR AEROSPACE
STUDIES;

(U) Random-Choice-Method Solutions for Two-Dimensional
Planar and Axisymmetric Steady Supersonic Flows.

DESCRIPTIVE NOTE: Interim rept..

    JAN 86   102P

PERSONAL AUTHORS: Shi Z. C. ;Gottlieb,J. J. ;

REPORT NO.   UTIAS-297

CONTRACT NO.   AFOSR-82-0096

PROJECT NO.   2307

TASK NO.   A1

MONITOR: AFOSR
    TR-86-0902

UNCLASSIFIED REPORT

ABSTRACT: (U)   A random choice method (RCM) is developed
for obtaining fairly practical and efficient numerical
solutions for two dimensional planar and axisymmetric
steady supersonic flows, such as those for sharp edged
planar airfoils, supersonic inlets of aircraft engines.
pointed bodies of revolution, supersonic nozzles, and
free jets. This method is based on the solution of a
riemann problem, which is the elemental solution of the
hyperbolic equations of two dimensional steady supersonic
flows. The Riemann problem consists of two waves
separated by a slip stream, and each wave can be either
an oblique shock wave or a Prandtl Meyer expansion wave.
Advanced techniques are given for solving the Riemann
problem iteratively, handling the boundary conditions
along body and free jet surfaces, and computing only
certain parts of flow fields of interest. Many
interesting and practical numerical solutions are
presented for different types of planar and axisymmetric
flows, to demonstrate the applicability, capability, and
limitations of the RCM. Numerical results are shown to be
in excellent agreement with both known analytical
solutions and results from the method of characteristics.

AD-A172 903

AD-A172 899   12/1

CALIFORNIA UNIV SAN DIEGO   LA JOLLA INST FOR PURE AND
APPLIED PHYSICAL SCIENCES

(U) The Analytic Structures of Dynamical Systems.

DESCRIPTIVE NOTE: Final rept. 1 Oct 85-31 Mar 86.

86   13P

PERSONAL AUTHORS: Weiss,John ;

CONTRACT NO.   AFOSR-84-0128

PROJECT NO.   2304

TASK NO.   A4

MONITOR: AFOSR
TR-86-0915

UNCLASSIFIED REPORT

ABSTRACT: (U)   A baclund transformation and linearization
for an instance of the henon heiles system is examined.
This provides a special form of solution depending on the
three parameters. In addition, a direct formulation in
terms of the schwarzian derivative is defined for the
henon heiles system and second Painleve transcendent.
This provides (1) a classification of the Henon Heiles
system as equations of Novikov type and; (2) a simple
method for deriving the Backlund transformations and
special solutions of the second Painleve transcendent. As
equations of Novikov type the integrable occurrences of
the Henon Heiles system can be completely integrated by
known methods.

DESCRIPTORS: (U)   *TRANSFORMATIONS(MATHEMATICS),
SOLUTIONS(GENERAL), PARTIAL DIFFERENTIAL EQUATIONS,
RICCATI EQUATION

IDENTIFIERS.   (U)   Backlund transformation, Henon Heiles
system, Painleve transcendent, Lax pairs, Miura
transformations, PE61102F, WUAFOSR2304A4

AD-A172 899

AD-A172 903   CONTINUED

DESCRIPTORS.   (U)   *SUPERSONIC INLETS, *STEADY FLOW,
SUPERSONIC FLOW, NUMERICAL ANALYSIS, BOUNDARY VALUE
PROBLEMS, TWO DIMENSIONAL, AXIALLY SYMMETRIC FLOW, DATA
REDUCTION, GRAPHS, CANADA

IDENTIFIERS.   (U)   Random choice method, Free jet flow,
Riemann problem, Prandtl Meyer flow

AD-A172 903

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A172 896   20/11   14/2   13/13

TEXAS A AND M UNIV COLLEGE STATION DEPT OF AEROSPACE
ENGINEERING

(U) Development of Constitutive Equations in Nonlinear
Aerospace Materials and Structures.

DESCRIPTIVE NOTE: Final rept. Jun 84-Apr 85.

APR 85   11P

PERSONAL AUTHORS: Allen,David H.

CONTRACT NO   AFOSR-84-0257

PROJECT NO   2/02

TASK NO   B1

MONITOR   AFOSR
TR-86-0857

UNCLASSIFIED REPORT

ABSTRACT   (U)   The instrumentation purchased under this
contract is a Materials Testing System (MTS) Model 880
uniaxial testing machine. In general, the system is used
to perform mechanical tests on aerospace structural
materials under prescribed thermal conditions. Typical
aerospace materials being tested include polymeric
composites, metal-matrix composites, and nickel-based
metals. These materials are utilized both in space
structures and advanced military aircraft. The primary
objective of the equipment is to provide experimental
data necessary to characterize the thermomechanical
material properties of the structural materials mentioned
above.

DESCRIPTORS   (U)   TEST EQUIPMENT   THERMOMECHANICS.
STRUCTURAL MEMBERS. EXPERIMENTAL DESIGN. VISCOELASTICITY.
COMPOSITE MATERIALS. AEROSPACE SYSTEMS. NICKEL ALLOYS.
CREEP. RESEARCH MANAGEMENT

IDENTIFIERS   (U)   Metal matrix materials. PE61102F
WUAFOSR2302B1

AD-A172 896

AD-A172 895   20/6   9/2

STANFORD UNIV   CA

(U) Optical Computing Research.

DESCRIPTIVE NOTE: Final rept. 18 May 85-30 Jun 86.

JUN 86   83P

PERSONAL AUTHORS: Goodman,Joseph W.

CONTRACT NO.   AFOSR-83-0166

PROJECT NO   2305

TASK NO   B1

MONITOR   AFOSR
TR-86-0911

UNCLASSIFIED REPORT

ABSTRACT   (U)   This report summarizes the work
accomplished since May 18, 1985, on Air Force Office of
Scientific Research Grant No. 83-0166. Work has been in
progress in four different areas: (1)Optical
interconnections; (2)Real-time defect enhancement in
periodic structures using four-wave mixing; (3)
Computation using neural networks; and (4)Optimal imaging
concentrators. Various administrative matters pertinent
to the grant are also discussed.

DESCRIPTORS   (U)   OPTICS. COMPUTERS.
BEAMS(ELECTROMAGNETIC). HOLOGRAPHY. SIGNAL PROCESSING.
DIFFRACTION ANALYSIS. DEFECTS(MATERIALS). OPTIMIZATION.
REAL TIME

IDENTIFIERS   (U)   Interconnections(optics). Optical
computing. Mixing(Four Wave). Clutter(Administrative).
Nural networks. Efficiency(Diffraction).
Concentrators(Imaging). Periodic structures

AC-A172 895

AD-A172 894   - J

AD-A172 894   CONTINUED

STANFORD UNIV CA DEPT OF CHEMISTRY

(U) Information on the Impact Parameter Dependence of the
     BaI Yields BaI V=8 + H Reaction.

DESCRIPTORS: (U)   *REACTION KINETICS. *BARIUM COMPOUNDS.
  *IODIDES. *MOLECULAR ROTATION. *LASER INDUCED
  FLUORESCENCE. HYDROGEN. KINEMATICS. IMPACT. PARAMETERS.
  PROBABILITY. COLLISIONS. VELOCITY. OPACITY. MOLECULAR
  VIBRATION. MOLECULAR STATES. REPRINTS.

JUL 86   12P

IDENTIFIERS: (U)   PE61102F. WUAFOSR2303B1

PERSONAL AUTHORS   Noda,Chifuru ;McKillop,John S. ;Johnson
Mark A. ;Waldeck,Janet R. ;Zare,Richard N .

CONTRACT NO.   F49620-85-C-0021 NSF CHE85-05926

PROJECT NO   2303

TASK NO   B1

MONITOR: AFOSR
            TR-86-1026

UNCLASSIFIED REPORT

ABSTRACT: (U)   Using selectively detected laser-induced
fluorescence, the rotational state distribution of the
BaI product has been measured for the beam-gas reaction
Ba + HI yield BaI (v = 8) + H. Owing to the highly
constrained kinematics for this system, these
measurements can be used to derive the reaction
probability as a function of the impact parameter for
this channel, called the specific opacity function, once
the reaction probability as a function of velocity has
been determined. Unfortunately, lack of knowledge of the
exoergicity and the height of any energy barrier prevents
a conclusive determination of the specific opacity
function for this reaction. Instead, various approximate
opacity functions are estimated based on different models
of the velocity dependence of the reaction channel
studied. If the reaction probability is the same for all
relative collision velocities, then the BaI(v = 8)
specific opacity function peaks strongly near 2.6 A with
a full width at half-maximum of 1.0 A. However, the
possible presence of a small energy barrier in the
entrance channel causes a cutoff in the relative
collision velocity distribution, and this type of
velocity dependence would significantly affect the shape
of the specific opacity function.

AD-A172 894

AD-A172 894

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN548

AD-A172 893   20 6

AD-A172 893   CONTINUED

CALIFORNIA UNIV IRVINE DEPT OF ELECTRICAL ENGINEERING

taken into account.

(U) Guided Wave Acoustooptic and Magnetooptic Devices for Integrated Optic Information Processing

DESCRIPTIVE NOTE: Annual rept. 1 Jan 84-30 Aug 85

AUG 86   35P

PERSONAL AUTHORS: Tsai,Chen S.

CONTRACT NO: AFOSR 80 0288

PROJECT NO: 2305

TASK NO: B1

MONITOR: AFOSR
TR-86-0879

DESCRIPTORS: (U) *OPTICAL WAVEGUIDES, *ACOUSTOOPTICS, *SURFACE ACOUSTIC WAVE DEVICES, BRAGG SCATTERING, ZINC OXIDES, GALLIUM ARSENIDES, YTTRIUM IRON GARNET, ALUMINUM GALLIUM ARSENIDE, MAGNETOOPTICS, FARADAY EFFECT, OPTICAL CIRCUITS, EPITAXIAL GROWTH, SINGLE CRYSTALS, LIQUID PHASES

IDENTIFIERS: (U) Cotton Mouton Effect, Gadolinium Gallium Garnet, PE61102F, WUAFOSR2305B1

UNCLASSIFIED REPORT

ABSTRACT   (U)   The research objectives of the current program year are focused on the basic interactions and physical mechanisms for guided wave acoustooptic Bragg diffraction from surface acoustic waves in GaAlAs optical waveguides and guided wave magnetooptic diffraction from magnetostatic surface waves in YIG-GGG optical waveguides. To a large degree the objectives have been accomplished. For the first project very significant progress has been made in the experimental phase. First a complete liquid phase epitaxy (LPE) system for growth of large size single mode GaAlAs optical waveguides has been established in-house. Second, the rf sputtering system was further improved to deposit good quality zinc oxide (ZnO) films on the top of the GaAlAs optical waveguides. and a novel electrode arrangement was facilitated to provide efficient transduction of the SAW for the first time a complete facility has been established to fabricate miniaturized acoustooptic Bragg cells in ZnO-GaAlAs composite waveguides with the device dimensions as small as 0.2 x 0.5 x 1.0 cm. For the second project, much progress has been made. The theoretical study, firmly identified and established the physical mechanisms for the non-collinear co-planar interaction configuration. Both Faraday and Cotton-Mouton effects are involved in a rather similar manner. In contrast to the collinear interaction in which only the Faraday effect has to be

AD-A172 893

AD A172 893

AD-A172 892   217   214   AD-A172 892   CONTINUED

ATLANTIC RESEARCH CORP ALEXANDRIA VA

(U) Fuel Solid Propellant Boron Combustion

DESCRIPTIVE NOTE   Final rept 15 Nov 84 28 Feb 86

AUG 86   32P

PERSONAL AUTHORS   King, Merrill K. ;Komar, J.

REPORT NO   41-5160F

CONTRACT NO   F49620 85 C 0020

PROJECT NO   2308

TASK NO   A1

MONITOR   AFOSR
          TR 86-0882

        UNCLASSIFIED REPORT

modeling options as regards nucleation and particle
growth processes were included in this analysis. Equation
development, computer coding, and model check out were
completed, and parametric studies with the model were
initiated during the course of this program.

DESCRIPTORS   (U)   *COMBUSTION, *OXYGEN, *PERMEABILITY,
*JET ENGINE FUELS, *SOLID PROPELLANTS, BORON, HYDROXIDES,
CONDENSATION, IGNITION, LIQUIDS, MODELS, REACTION
KINETICS, VAPOR PHASES, NUCLEATION, PARTICLES,
GROWTH(GENERAL), FILMS, NOZZLES, FLOW

IDENTIFIERS   (U)   PE61102F, WUAFOSR2308A1

ABSTRACT   (U)   An apparatus for measurement of the
permeability of oxygen gas through liquid boric oxide as
a function to temperature was designed and built.
Numerous difficulties were encountered in the course of
this study, the most intractable being the uptake of
oxygen by vessel wall materials at rates which swamped
the rate of transport across the liquid boric oxide film
separating vessels with differing initial oxygen levels,
resulting in data with an unusably low signal-to-noise
ration A burner and two-dimensional nozzle device were
designed (and the burner constructed) for study of
condensation of boron oxides and hydroxides (all to boric
oxide) with elimination of hydrogen and excess oxygen as
required by stoichiometry consideration in the latter
case) from dry and wet combustion atmospheres, with and
without seeding with submicron refractory solid particles
as heterogeneous nuclei In addition diagnostic
procedures for uses in this condensation study (to be
actually performed under a subsequent AFWAL WORT contract)
were selected from a wide array of potential candidates.
A condensation model treating the flow of boron loaded
combustion product stream through the nozzle with
multiphase...

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO EVN548

AD A172 890   20 12   7 4   13 5

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES

U Apparatus for Analysis of Epitaxial Crystal Growth

DESCRIPTIVE NOTE Final rept 1 Aug 8 1 Oct 84

JUL 85   7P

PERSONAL AUTHORS Daphus P D

CONTRACT NO AFOSR 83 0277

PROJECT NO 2 317

TASK NO   A3

MONITOR   AFOSR
          TR 86 0913

UNCLASSIFIED REPORT

ABSTRACT   U   In this grant funds were requested and
received for the purchase of an epitaxial growth and
analysis apparatus necessary to investigate the chemistry
photochemistry and kinetics of growth of semiconductor
thin films metallographic chemical vapor deposition
MOCVD This apparatus consists of an epitaxial growth
chamber compatible with the inclusion of in situ
diagnostic techniques an excimer dye laser system for
use in laser induced fluorescence studies of
gasphase concentration profiles spectra of surfaces with
analysis of gaseous constituents in MOCVD growth
reactions these laser were used to monitor the kinetics of
epitaxial growth permitting optimization of the kinetics of
MOCVD

DESCRIPTORS   U   CHEMICAL ANALYSIS   LABORATORY
EQUIPMENT   METAL DEPOSITION THIN   EPITAXIAL GROWTH
GROWTH METALLIC CAMBERS   LASER DYE FLUORESCENCE
MASS SPECTROMETERS

IDENTIFIERS   U   Semiconductor films   Excimer lasers
Metal organic chemical vapor deposition PE61102F
WHAFOSR2317 A3

AD A172 889   20 9   7 4

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

U Spatial Distribution Profiles of Ca, Cu, and Mn Atoms
   and Ions in an Inductively Coupled Plasma by Means of
   Laser Excited Fluorescence.

DESCRIPTIVE NOTE   Interim rept

85   10P

PERSONAL AUTHORS   Huang X   Yean K S   Winefordner, J D

CONTRACT NO   F49620-84 C 0064

PROJECT NO   2 303

TASK NO   A1

MONITOR   AFOSR
          TR 86 1024

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in Spectrochimica Acta v40B n10-
12 p1373 1385

ABSTRACT   U   Radial distribution profiles of ground
state atoms and or ions for calcium, manganese, and
copper in an inductively coupled plasma have been
measured using an excimer x10 pumped dye laser as an
excitation source of fluorescence As a comparison
radial emission profiles also have been measured with an
Abel inversion procedure In our low-flow nebulizer
plasma system at low observation heights the profiles of
excited state atoms and ions resemble each other with a
minimum in the center of the plasma The profiles of
ground state atoms and ions however possess a hole
shape except for calcium ground state ions which have
double peaked distribution

DESCRIPTORS   U   PLASMAS PHYSICS   CALCIUM   COPPER
MANGANESE   SPATIAL DISTRIBUTION   LASER INDUCED
FLUORESCENCE ATOMS IONS GROUND STATE DYE LASERS
EXCITATION EMISSION PROFILES ATOMIC SPECTROSCOPY
PREPRINTS

IDENTIFIERS   U   Inductively Coupled Plasmas PE61102F

AD A172 889

AD A172 862   USAF. R CTROL NO   EVN54E

WUAFOSR2307A4

STANFORD UNIV. CA. DEPT OF MECHANICAL ENGINEERING

U   Annual Report for Contract F49620 84 K 0004

DESCRIPTIVE NOTE   Rept for 1 Jan 31 Dec 84.

MAR 85   21P

PERSONAL AUTHORS   Kline,S .J ,Ferziger,J H ,Johnston,J.
P ,Moffat R J

CONTRACT NO   F49620 84 K 0004

PROJECT NO   2307

TASK NO   A4

MONITOR   AFOSR
          TR 086 0869

UNCLASSIFIED REPORT

ABSTRACT   (U)   This is the annual report covering
Theoretical and Empirical Studies of the Basic Structure
of Turbulent Shear Flows, Including Separated Flows and
Effects of Wall Curvature. This contract includes work on
two distinct projects. Task A. Construction of zonal
models for computation of complex turbulent flows. Task B
Study of turbulence structure and heat convection in
turbulent boundary layers or concave surfaces.

DESCRIPTORS: (U)   TURBULENT BOUNDARY LAYER, SHEAR
PROPERTIES, CONVECTION/HEAT TRANSFER, WALLS, CURVATURE,
MATHEMATICAL MODELS, TURBULENT FLOW, NAVIER STOKES
EQUATIONS, HEAT TRANSFER

IDENTIFIERS   (U)   PE61102F, WUAFOSR2307A4

AD A172 862

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD A172 880   22/2   20/11

MASSACHUSETTS UNIV AMHERST DEPT OF CIVIL ENGINEERING

(U) Parametric Investigation of Factors Influencing the Mechanical Behavior of Large Space Structures.

DESCRIPTIVE NOTE: Final technical rept 1 Nov 82-30 Jun 85

MAY 86   451P

PERSONAL AUTHORS: Nash,William A ; Lardner,Thomas J .

CONTRACT NO AFOSR-83-0025

PROJECT NO 2302

TASK NO B1

MONITOR AFOSR TR-86-0858

UNCLASSIFIED REPORT

ABSTRACT (U) The investigation has two objectives (1) To investigate the relative importance of factors such as thermal gradients, differential gravitational effects, solar radiation pressure, albedo effects and spatial pressure gradients on structural behavior of large space structures, and (2) To investigate structural behavior of a very thin membrane subject to combined internal pressure as well as mechanical and thermal loadings

DESCRIPTORS (U) *SPACECRAFT, *STRUCTURAL PROPERTIES, FLEXIBLE STRUCTURES, TRUSSES, VIBRATION, GRAVITATIONAL FIELDS, GRADIENTS, RADIATION PRESSURE, ALBEDO, THERMAL STRESSES, THIN FILMS, MEMBRANES, COMPUTER PROGRAMS, EQUATIONS OF MOTION, STRESS STRAIN RELATIONS

IDENTIFIERS (U) Space structures, Very large structures, ECHO 1 satellite, ECHO 2 satellite, PE61102F WUAFOSR2302B1

AD A172 880

DTIC REPORT BIBLIOGRAPHY

AD A172 881   12/1

NORTH CAROLINA STATE UNIV AT RALEIGH DEPT OF MATHEMATICS

(U) Progress Report Number 2 on Contract AFOSR 84 0240

DESCRIPTIVE NOTE: Rept for 16 Jul 81 15 Dec 85

JAN 86   13P

PERSONAL AUTHORS: Campbell,Stephen L

CONTRACT NO AFOSR 84 0240

PROJECT NO 2304

TASK NO A1

MONITOR AFOSR TR 85 0897

UNCLASSIFIED REPORT

ABSTRACT (U) Implicit systems of differential equations of the form E(t) x' = v v v v naturally arise in many circuit and control problems, economic models, and the solution of partial differential equations by the method of lines. Implicit systems are also called singular, differential algebraic, constrained and descriptor. The theory, numerical and numerical codes exist for index zero, index one and linear constant coefficient singular systems of ...

DESCRIPTORS (U) *DIFFERENTIAL EQUATIONS, *RESEARCH MANAGEMENT, *NUMERICAL ANALYSIS, SOLUTIONS GENERAL, LINEAR SYSTEMS

AD A172 881

AD-A172 861   20/4   12/1

NIELSEN ENGINEERING AND RESEARCH INC MOUNTAIN VIEW CA

(U) A Fundamental Study of Jet Flows.

DESCRIPTIVE NOTE: Final rept. 1 Mar 82-28 Feb 85.

APR 85   25P

PERSONAL AUTHORS: Nixon,David ;

REPORT NO.   NEAR-TR-345

CONTRACT NO.   F49620-82-C-0031

PROJECT NO.   2307

TASK NO.   A1

MONITOR: AFOSR
TR-86-0896

UNCLASSIFIED REPORT

ABSTRACT: (U)   This work investigated the fluid mechanics
of impinging jet flows and to this end a combined
theoretical, computational and experimental study was
initiated. A very detailed set of experimental results
for multiple impinging jets in a crossflow is available.
The theoretical and computational study is concerned
partly with modeling of the turbulence. An important
result is that it appears that even the most
sophisticated turbulence model available will not
reproduce the experimental results adequately.

DESCRIPTORS: (U)   *JET FLOW, *TURBULENCE, *CROSS FLOW.
FLUID MECHANICS. COLLISIONS. COMPUTATIONS. FLUID DYNAMICS.
TIME DEPENDENCE

IDENTIFIERS: (U)   Computational fluid dynamics. Impinging
jets. WUAFOSR2307A1. PE61102F

AD-A172 857   12/1

MISSISSIPPI STATE UNIV MISSISSIPPI STATE DEPT OF
AEROPHYSICS AND AEROSPACE ENGINEERING

(U) Generation of Surface Grids through Elliptic Partial
Differential Equations for Aircraft and Missile
Configurations.

DESCRIPTIVE NOTE   Interim rept. Apr 85-Mar 86.

MAY 86   20P

PERSONAL AUTHORS   Warsi,Z U. ;

REPORT NO.   AASE-86-293

CONTRACT NO   AFOSR-85-0143

PROJECT NO   2304

TASK NO   A3

MONITOR: AFOSR
TR-86-1063

UNCLASSIFIED REPORT

ABSTRACT   (U)   This report is devoted to a computational
method of mesh generation in arbitrary surfaces by
utilizing a set of elliptic partial differential
equations. These equations depend explicitly on the mean
curvature and the unit normal vector of the surface in
which the coordinates are to be generated. To determine
the mean curvature for a given surface in global
coordinates, first a piecewise least squares method is
used to fit a surface through the given data points. Next,
mesh generation results for various geometrically
complicated shapes have been obtained to demonstrate the
versatility of the proposed equations. An example of a
monoclinic coordinate system with contraction in the
coordinate leaving the surface has also been presented.

DESCRIPTORS   (U)   *GRIDS/COORDINATES', MESH. NUMERICAL
METHODS AND PROCEDURES. PARTIAL DIFFERENTIAL EQUATIONS.
LEAST SQUARES METHOD. ELLIPSES. ALGORITHMS

IDENTIFIERS   (U)   WUAFOSR2304A3. PE61102F

AD A172 857

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 853   20/4   12/1

AD-A172 853   CONTINUED

FLOW INDUSTRIES INC KENT WA RESEARCH AND TECHNOLOGY DIV

FILTERS, NUMERICAL ANALYSIS, CONVERGENCE, INVISCID FLOW, COMPRESSIBLE FLOW

(U) Pseudospectral Method for Transonic Flows Around an Airfoil

IDENTIFIERS: (U) Pseudospectral methods, Spectral methods, Spectral decomposition, WUAFOSR2307A1, PE61102F

DESCRIPTIVE NOTE   Annual rept. 1 Feb 84-31 Jan 85.

MAR 85   53P

PERSONAL AUTHORS   Jou W H , Mueller A C .

CONTRACT NO   F49520-84-C-0027

PROJECT NO   2307

TASK NO   A1

MONITOR   AFOSR
TR 86 0365

UNCLASSIFIED REPORT

ABSTRACT   (U)   This investigation attempted to construct a pseudospectral scheme that is highly accurate and competitive in computational efficiency with existing finite difference or finite volume methods. A hybrid scheme using spectral decomposition in the direction along the airfoil surface and a finite difference scheme in the other direction was found to be capable of resolving shock waves in one grid. Several filters have been studied. A low pass filter in the spectral space was not able to stabilize the computation without seriously affecting the shock resolution. An algebraic filter that averages the flow variables around a grid point was capable of stabilizing the computations and maintaining the sharpness of the shock wave. The residue of the scheme did not decrease with time. The number of supersonic points in the flow field was taken as an indicator of convergence. Attempts to find another form of error norm were not successful. An explicit full spectral scheme studied with a Chebyshev polynomial expansion required excessive computing time and would not be competitive with a finite volume calculation using a dense grid.

DESCRIPTORS   (U)   *TRANSONIC FLOW , *AIRFOILS , SPECTRUM ANALYSIS , COMPUTATIONS , HYBRID SIMULATION , SHOCK WAVES , DECOMPOSITION , FINITE DIFFERENCE THEORY , MATHEMATICAL

AD A172 853

AD A172 647

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

(U) An ICP-Excited ICP Resonance Monochromator and
Fluorescence Spectrometer for the Analysis of Trace to
Major Sample Constituents.

DESCRIPTIVE NOTE: Interim rept...

    85   10P

PERSONAL AUTHORS: Krupa.R J ;Long.G L ;Winefordner.J
D

CONTRACT NO. F49620-84-C-0002

MONITOR: AFOSR
          TR 86-1025

            UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub in Spectrochimica Acta. v40B n10-
12 p1485-1494 1985

ABSTRACT: (U) A 20 g/l solution of the element of
interest is aspirated into a 1500 W Ar ICP and the
resulting emission used to excite atomic and ionic
fluorescence of a sample aspirated into a second ICP.
Detection limits are comparable to ICP-AES. By aspirating
the sample into the source ICP and measuring its emission
using the second plasma as a resonance monochromator,
linear dynamic ranges up to 50 million can be achieved.
Plasma emission background and spectral interferences are
minimal compared to ICP-AES because of the selectivity of
the selectivity of the fluorescence technique. The
present system should be considered as a viable
alternate to emission spectrometry in order to
alleviate spectral interferences which may occur in
complex sample matrices without the need for an
expensive, high resolution monochromator.

DESCRIPTORS: (U) *QUANTITATIVE ANALYSIS, *FLUORESCENCE,
*ATOMIC SPECTROSCOPY, PLASMA DEVICES, EXCITATION, DYNAMIC
RANGE, REPRINTS, ATOMIZATION

IDENTIFIERS: (U) ICP(Inductively Coupled Plasmas),
AFS(Atomic Fluorescence Spectroscopy), Resonance
monochromators, Atomic fluorescence Spectroscopy,
PE61102F

AD-A172 647

AD A172 829   20/4

TORONTO UNIV DOWNSVIEW (ONTARIO) INST FOR AEROSPACE
STUDIES

(U) Some Aspects of Shock-Wave Research.

DESCRIPTIVE NOTE: Interim rept...

    JAN 86   116P

PERSONAL AUTHORS: Glass.I. I. ;

REPORT NO. UTIAS-REVIEW-48

CONTRACT NO. AFOSR-82-0096, DNA001-85-C-0368

PROJECT NO. 2307

TASK NO. A1

MONITOR: AFOSR
          TR-86-0894

            UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the AIAA Aerospace
Sciences Meeting (24th) Reno, Nv 7 Jan 86.

ABSTRACT: (U) A few examples are given of shock wave
phenomena on earth and in space to provide some useful
background material. The major portion of the paper is
devoted to a specific shock wave research problem, namely,
pseudostationary oblique shock wave reflections in
perfect and imperfect gases. Consideration is given to
what has been achieved to date by using two and three
shock theory to predict what type of reflection results
when a planar shock wave M sub s, in a shock tube,
collides with a sharp compressive wedge of angle, Theta
sub w Experimental (interferometric and other optical)
data are presented in M sub s, Theta sub w-plots for
argon, nitrogen, oxygen, air, carbon-dioxide, Freon 12
and sulfurhexafluoride, in order to check the validity of
the analytically predicted regions and transition lines
of the four types of reflection. Some disagreements are
noted and discussed. Our interferometric isopycnic data
are also compared with state of the art computational
results from a solution of the inviscid Euler equations
using a CRAY 1 computer. Good agreement was obtained, yet
it would be important to obtain new data by solving the

AD-A172 829

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A172 829   CONTINUED

Navier Stokes equations, as well as the rate equations
for imperfect gas excitations, in order to judge the
improvement obtained with real flow interferograms.

DESCRIPTORS: (U)   SHOCK WAVES. (FLUID DYNAMICS. MONTE
CARLO METHOD. HEIGHT OF BURST. FLOW FIELDS.
INTERFEROMETRY. REFLECTION. SHOCK TUBES. INVISCID FLOW.
NAVIER STOKES EQUATIONS. ARGON. NITROGEN. OXYGEN. AIR.
CARBON DIOXIDE. FLUORINATED HYDROCARBONS. SULFUR
COMPOUNDS. CANADA

IDENTIFIERS: (U)   Pseudo stationary. Sulfur hexafluorides.
Euler equations. PE61102F. WUAFOSR2307A1

AD-A172 827   21/2   21/1   20/4

PURDUE UNIV LAFAYETTE IND THERMAL SCIENCES AND
PROPULSION CENTER

(U) Fuel Spray Ignition by Hot Surfaces and Aircraft Fire
Stabilization.

DESCRIPTIVE NOTE: Final rept. 15 Nov 81-31 Mar 86.

JUN 86   33P

PERSONAL AUTHORS: Skifstad,J. G. ;Lefebvre,A. H. ;Murthy,
S. N. ;

REPORT NO.   LMS/AFOSR-COMB/83

CONTRACT NO.   AFOSR-82-0107

PROJECT NO.   2308

TASK NO.   A2

MONITOR: AFOSR
TR-86-0856

UNCLASSIFIED REPORT

ABSTRACT: (U)   In Task I an experimental study of the
ignition of Jet-A fuel sprays by an isothermal hot
surface was conducted in a vertical axisymmetric duct. In
addition to measurements of the wall temperature
necessary for ignition, local measurements of velocity,
turbulence intensity, fuel concentration, and the
fraction of fuel vaporized were measured in the boundary
layer at surface temperatures just below that required
for ignition. In Task II two combustion tunnel facilities
were used to investigate the stabilization of aircraft
fires. Results showed that the shape of a bluff-body
flameholder affects its stability characteristics through
its influence on the size and shape of the wake region.
Another significant finding was that the flameholding
properties of the single-vortex flow pattern are markedly
superior to those of the double-vortex pattern. In Task
III experimental studies were conducted on: (1)
Entrainment of an external flow into a cavity, with a
small opening or vent in a side wall, when there is a
small flow through the cavity; and (2) Fluid dynamics and
ignition and flame stability characteristics of a jet of
gaseous fuel through a protrusion of different shapes and

AD-A172 827

AD-A172 829

AD-A172 826   20/4

RUTGERS - THE STATE UNIV NEW BRUNSWICK N J DEPT OF
MECHANICAL INDUSTRIAL AND AEROSPACE ENGINEERING

(U) Theoretical Investigation of Three-Dimensional Shock
Wave-Turbulent Boundary Layer Interactions. Part 4.

DESCRIPTIVE NOTE: Interim rept. 1 Oct 84-30 Sep 85.

JAN 86   74P

PERSONAL AUTHORS: Knight,Doyle D. ;

REPORT NO.   RU-TR-163-MAE-F

CONTRACT NO.   AFOSR-82-0040

PROJECT NO.   2307

TASK NO.   A1

MONITOR: AFOSR
TR-86-0893

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: See also Part 1, AD-A127 118.

ABSTRACT: (U) A theoretical model consists of the
Reynolds-averaged 3-D compressible Navier-Stokes
equations, with turbulence incorporated using the
algebraic turbulent eddy viscosity model of Baldwin and
Lomax. This year research efforts focused on both 2-D and
3-D turbulent interactions. A theoretical model was
examined for a series of separated 2-D compression corner
flows at Mach 2 and 3. Calculations were performed for
four separate compression corners using 2-D compressible
Navier-Stodes conde with MacCormack's hybrid algorithm.
Results were compared to earlier computations using the
Beam Warming algorithm, and recent experiment data for
turbulent Reynolds stresses. Calculated Reynolds stresses
were observed to differ significantly from experimental
measurements due to the inability of the turbulence model
to incorporate the multiple scale effects of the
turbulence structure downstream of reattachment Computed
results using the MacCormack hybrid algorithm were
observed to be insensitive to the Courant number The 3-D
turbulence interactions research concentrated on the 3-D
sharp fin and on the 3-D swept compression corner In the

AD-A172 826

AD-A172 827   CONTINUED

heights in the wall of a cavity with a small flow of air
through the cavity

DESCRIPTORS   (U)   *FUEL SPRAYS, *IGNITION, *FLAMES,
*AIRCRAFT FIRES, ENTRAINMENT, VOIDS, FLAME HOLDERS, BLUNT
BODIES, STABILIZATION, WAKE, VORTICES, CAVITIES, JET
ENGINE FUELS, VAPORS, DROPS, BOUNDARY LAYER, SURFACE
TEMPERATURE, MODEL TESTS, FLOW FIELDS, BLOWOFF, FLUID
DYNAMICS, AIR FLOW, FLOW VISUALIZATION, THREE DIMENSIONAL
FLOW, GAS TURBINES, RAMJET ENGINES

IDENTIFIERS   (U)   Jet A fuel, Flame stability, Reactive
flow, Blowoff velocity

AD-A172 827

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 826   CONTINUED

former case, the computed flowfield for the 20 deg sharp
fin at Mach 3 and a Reynolds number of 930,000 was
compared with the calculated results of Horstman (who
used the Jones-Launder turbulence model) and experimental
data of the Princeton Gas Dynamics Lab. Overall
comparison with experiment was very good.

DESCRIPTORS: (U) *TURBULENT BOUNDARY LAYER, *SHOCK WAVES.
MATHEMATICAL MODELS. COMPRESSIBLE FLOW. INTERACTIONS.
THREE DIMENSIONAL FLOW. NAVIER STOKES EQUATIONS.
EDDIES(FLUID MECHANICS). FLOW SEPARATION. SUPERSONIC FLOW.
FLOW SEPARATION. STRESSES. TWO DIMENSIONAL FLOW.
SUPERSONIC FLOW. VISCOUS FLOW. INVISCID FLOW. FLUID
DYNAMICS. COMPUTATIONS. ALGORITHMS. HYBRID SYSTEMS

IDENTIFIERS: (U) Corner flow. Reynolds stresses. High
speed flows. Viscous inviscid interactions. Shock
boundary layer interactions. Computational fluid dynamics.
PE61102F. WUAFOSR2307A1

AD-A172 821   12/1

FLORIDA STATE UNIV TALLAHASSEE DEPT OF STATISTICS

(U) Optimal Assembly of Systems Using Schur-Functions and
Majorization.

DESCRIPTIVE NOTE: Technical rept.,

JUL 86   17P

PERSONAL AUTHORS: El-Neweihi,Emad ;Proschan,Frank ;
Sethuraman,Jayaram ;

REPORT NO: TR-M735

CONTRACT NO: DAAL03-86-K-0094, AFOSR-85-0320

MONITOR: AFOSR.ARO
TR-86-193.23699.6-MA

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper considers the optimal assembly
of n systems from components of k types. Special cases of
such a problem have been studied earlier in the
literature. E Neweihi, Proschan and Sethuraman (1986)
studied the case of a single type of components. Derman.
Leiberman and Ross (1972) considered the case where each
system consisted of one component of each of k types. We
generalize the ideas of both of these papers to the case
where the systems may consist of varying numbers of
components from more than one type. An assembly of the n
systems corresponds to a partitioning A of the components
to the different systems. When the components act
independently, we show in sections 2 and 3 that an
intuitively motivated partitioning A* provides the
optimal assembly under many different criteria. In
section 3, we allow each system to have dependent
components, and under some general conditions on the
reliability function we show that the same partitioning A
* provides an optimal assembly. The results of this paper
are based on the well known techniques of Schur-
functions and majorization. This makes them clear and
simple and at the same time more general that in the
papers cited. (Author)

DESCRIPTORS: (U) *FUNCTIONS(MATHEMATICS). METHODOLOGY.
PARTS. ASSEMBLY. OPTIMIZATION. RELIABILITY

AD-A172 821

AD-A172 826

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 821   (CONTINUED)

IDENTIFIERS   U   Schur functions   LPN AFOSR 84-0007

AD-A172 813   13/13   22/2

FLORIDA UNIV GAINESVILLE DEPT OF MATHEMATICS

U) Increasing the Margin of Stability of Arbitrarily Finite Modes of Flexible Large Space Structures with Damping.

DESCRIPTIVE NOTE: Annual technical rept. 1 Sep 85-3 Aug 86.

AUG 86   6P

PERSONAL AUTHORS: Lasiecka,I. ;Triggiani,R. ;

CONTRACT NO.   AFOSR-84-0365

PROJECT NO.   2304

TASK NO.   A1

MONITOR: AFOSR
TR-86-0878

UNCLASSIFIED REPORT

ABSTRACT: (U)   This research project focuses on a canonical component of flexible large space structures, which is modeled by a hyperbolic second order equation (wave equation) with damping, in an arbitrary number of dimensions. The object is to provide a simple, implementable boundary feedback of a specific class which will (1) increase the margin of stability of finitely many modes while (2) at least preserving the margin of stability of the remaining modes and, moreover, (3) guarantee the exponential uniform decay of all feedback solutions with the same upper bound enjoyed by the free solutions (homogeneous boundary conditions). An analysis of the distributed parameter model is given by the co-principal investigators, which provides a theoretical solution of the above problem in an essentially constructive way. Numerical implementations of the theoretical proof show a behavior of the eigenvalues distribution of the feedback system as predicted by, and in agreement with, the theoretical results

DESCRIPTORS: (U)   *STRUCTURES, *STABILITY, SPACE SYSTEMS, FLEXIBLE STRUCTURES, DAMPING

IDENTIFIERS   (U)   *Large space structures, WUAFOSR2304A1,

AD-A172 813

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 812   20/4

NOTRE DAME UNIV IN DEPT OF AEROSPACE AND MECHANICAL ENGINEERING

(U) Vortex Loop Dynamics - A Phenomenological Model for Turbulent Boundary Layer Structure.

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 83.

APR 84   28P

PERSONAL AUTHORS: Doligalski,Thomas L.,

CONTRACT NO.   AFOSR-82-0115

PROJECT NO   2307

TASK NO.   A2

MONITOR: AFOSR
TR-86-0867

UNCLASSIFIED REPORT

ABSTRACT: (U)   Unsteady development of three-dimensional vortex loops in the vicinity of solid surfaces and under the influence of a crossflow is detailed. These results are important if the dynamics of the coherent structures present within the turbulent boundary layer are to be understood--it has long been recognized that the 3-D convecting stretching vortex loop is a major component of these flows. A new piston-orifice vortex generator and test section was designed to provide reliable and repeatable vortex rings in air, which are allowed to propagate across the test section and interact with a large plexiglass plate. The rings are marked with smoke tracers. The subsequent interaction is recorded using high-speed motion picture photography. Results are given for normal and oblique impacts in still air and for oblique impacts in uniform flow. The analytic effort was devoted to improving the efficiency of the 3-D inviscid vortex trajectory program. This program uses a modified Biot-Savart integration technique to consider the unsteady inviscid development of vortex structures in vicinity of solid surfaces. Studies of normal and oblique impacts with solid surfaces under conditions of no imposed flow are detailed, as well as oblique impacts in uniform and linear shear flows. The experimental and analytic results were compared and excellent

AD-A172 812

UNCLASSIFIED

AD-A172 813   CONTINUED

PE61102F

AD-A172 813

AD A172 811   22/2

MCINTOSH STRUCTURES DYNAMICS INC PALO ALTO CA.

(U) Investigation of Interactive Structural and Controller
    Synthesis for Large Spacecraft

DESCRIPTIVE NOTE: Final rept. 1 Mar 84-30 Oct 85.

JAN 86   45P

PERSONAL AUTHORS: McIntosh,Samuel C. , Jr.;Floyd,Michel A.

REPORT NO.   TR-86-1

CONTRACT NO.   F49620-84-C-0025

PROJECT NO.   2302

TASK NO.   B1

MONITOR: AFOSR
           TR-86-0900

                  UNCLASSIFIED REPORT

ABSTRACT: (U)   A technique is developed for least-weight
optimal design of a tubular-truss space structure,
subject to constraints on its natural frequencies and its
open-loop disturbance-rejection properties. The
disturbance-rejection properties of the structure are
measured by disturbance-to-regulated-variable grammians.
It is shown how this technique can be embedded in a model-
reduction scheme based on internal balancing. Examples
treated include a simple dumbell model and csdl model no.
1. (Author)

DESCRIPTORS: (U)   *STRUCTURAL ENGINEERING, *SPACECRAFT,
*CONTROL SYSTEMS, FLEXIBLE STRUCTURES, TUBULAR STRUCTURES,
OPTIMIZATION, MANEUVERABILITY, VIBRATION, TABLES(DATA)

IDENTIFIERS: (U)   WUAFOSR2302B1, PE61102F

AD-A172 811

AD A172 812   CONTINUED

correspondence between the two techniques was found
These studies indicate that substantial loop growth
occurs due to the presence of an imposed shear, and it is
this interaction between the loop and the imposed
crossflow that plays a dominant role in the loop
deformation process

DESCRIPTORS: (U)   *TURBULENT BOUNDARY LAYER, *BOUNDARY
LAYER FLOW, *VORTICES, LOOPS, STRUCTURAL PROPERTIES,
THREE DIMENSIONAL FLOW, CROSS FLOW, SOLIDS, PLATES,
IMPACT, RINGS, FLOW VISUALIZATION, HIGH SPEED PHOTOGRAPHY,
INTERACTIONS, DEFORMATION, SHEAR PROPERTIES, COMPUTER
PROGRAMS, NUMERICAL INTEGRATION

IDENTIFIERS: U: Vortex loops, Oblique impact, Shear
flow, WUAFOSR2307A2, PE61102F

AD A172 812

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A172 798   11/2

AD-A172 798   CONTINUED

SRI INTERNATIONAL MENLO PARK CA

(U) Observations and Analysis of Microcracks Produced in
Dynamic Tension Tests of Concrete

DESCRIPTIVE NOTE: Final rept. 1 May 82-31 May 86.

JUL 86   99P

PERSONAL AUTHORS: Gran,James K. ;Seaman,Lynn .

CONTRACT NO: .49620-82-K-0021

PROJECT NO: 2307

TASK NO: C2

MONITOR   AFOSR
TP 86-0866

UNCLASSIFIED REPORT

DESCRIPTORS: (U) *CONCRETE, *TENSION, *MICROCRACKING,
TENSILE PROPERTIES, TEST METHODS, TENSILE TESTERS, CRACK
PROPAGATION

IDENTIFIERS: (U) LPN-PYU-4451, WUAFOSR2307C2, PE61102F

ABSTRACT   (U)   An important need in the study of dynamic
tensile failure in concrete and brittle geologic
materials is to characterize the failure process for a
wide range of strain rates The objective of this four-
year research program was to develop and demonstrate
experimental and analytical techniques to study the
dynamic tensile failure of concrete at strain rates
between 10 s and 100 s The primary accomplishments of
this program were (1) A new experimental method was
developed to produce tensile failure in concrete in the
presence of confining pressure at a strain rate of about
20 s (2) A preliminary set of experiments was conducted
to study the unconfined and confined tensile failure of
concrete at a strain rate of about 20 s (3) These
experiments were interpreted with numerical calculations
to estimate the dynamic strength enhancement the
apparent strain-softening behavior of the concrete and
the extent of damage in the specimens (4) A technique
was developed to observe the microcrack damage in the
tensile specimens microcracks were charted for a
concrete specimen after a dynamic tension experiment (5)
Analyses of microcrack growth showed that crack
propagation directly may be the source of the tensile
strength enhancement observed in the dynamic tension
experiment.

AD-A172 798

AD A172 739   20 11

AD A172 739   CONTINUED

CARNEGIE MELLON UNIV, PITTSBURGH PA DEPT OF MECHANICAL
ENGINEERING

The validity and consequence of some of these assumptions
are discussed.

(U) The Influence of Electric Current on Crack Propagation
in Thermal Fatigue Tests

DESCRIPTORS (U) 'THERMAL FATIGUE, 'CRACK PROPAGATION,
'ELECTRIC CURRENT HEATING, CRACKS, STRESSES, TEMPERATURE,
DISTRIBUTION, TEST METHODS, FATIGUE TESTS/MECHANICS)

DESCRIPTIVE NOTE Final rept 1 Aug 84-31 Jul 85

IDENTIFIERS (U) Crack tips, PE61102F, WUAFOSR2302B2

FEB 86   44P

PERSONAL AUTHORS Griffin, Jerry H

REPORT NO 1-52113

CONTRACT NO   AFOSR 84-0203

PROJECT NO 2302

TASK NO   B2

MONITOR   AFOSR
          TR 86-0836

UNCLASSIFIED REPORT

ABSTRACT   (U)   The use of a benchmark or model problem to
estimate errors in stress intensity factors and local
temperatures in thermal mechanical fatigue testing which
uses large electric currents for heating has shown that
this mode of testing results in a more severe stress
state than if conventional heating methods are used. The
reason for the more severe stress state is that the
application of a constant voltage across a cracked
specimen results in a singular current and, consequently,
a singular heat source. The singular heat source does not
result in a temperature singularity, however, so the
temperature remains bounded at the crack tip The
relative discrepancy between conventional heating fatigue
testing and resistance heating fatigue is quite dependent
on crack size and materials properties, primarily thermal
and electrical conductivity and linear thermal expansion.
Materials exhibiting low electrical resistance and high
thermal expansion are, in general, more susceptible to
this mode of thermal loading Simple expressions for
estimating the contribution of electric current to the
stress intensity factor and local temperature field were
developed These expressions are estimated in light of
some basic assumptions made during problem formulation

AD A172 739

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 736   12-1   AD A172 736   CONTINUED

CLEMSON UNIV. SC DEPT OF MATHEMATICAL SCIENCES   IDENTIFIERS   (U)   PE61102F. WUAFOSR2304A1

(U) Control Coordination of Large Scale Hereditary Systems

DESCRIPTIVE NOTE: Annual rept 1 Jul 84-1 Jul 85.

JUL 85   57P

PERSONAL AUTHORS: Fennell, Robert Renola, J. A.

CONTRACT NO.   AFOSR 84-0236

PROJECT NO.   2304

TASK NO   A1

MONITOR   AFOSR
          TR-86-0895

UNCLASSIFIED REPORT

ABSTRACT   (U)   A decentralized control strategy, which
allows some level of autonomous component control for
large scale hereditary systems, has been developed. The
basic problem considered is how to add constraints at the
component objectives and to arrange exchanges of
information which enable all components to achieve their
objectives. The approach requires that component
interactions be suitably limited so that variational
methods can be used to determine component controls
independently. A reproducing kernel Hilbert space of
Hellinger integrable functions provides the setting for
the description of system operation and the analysis of
optimization problems. This work has been reported in
papers entitled Decentralized Control for Large Scale
Hereditary Systems and Control Coordination for Large
Scale System. In other related work geometric algebraic
and graph theoretic properties of system matrices have
been characterized which allow some autonomy in the
choice of component control laws. This is reported in a
paper entitled Canonical Forms for Decentralized Control

DESCRIPTORS: (U)   CONTROL THEORY, SYSTEMS APPROACH,
DECENTRALIZATION, ITERATIONS, VARIATIONAL METHODS.
HILBERT SPACE, OPTIMIZATION, TRANSFORMATIONS MATHEMATICS,
STOCHASTIC PROCESSES, KERNEL FUNCTIONS, LAPLACE
TRANSFORMATION, APPROXIMATION MATHEMATICS

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO EVN54B

AD-A172 727   20/4   12/1

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF AERONAUTICS AND ASTRONAUTICS

(U) Computational Methods for Complex Flow Fields

DESCRIPTIVE NOTE: Annual rept.

JUN 86   47P

PERSONAL AUTHORS   Murman,Earll M ;Baron,Judson R

CONTRACT NO   AFOSR-82-0136

PROJECT NO.   2307

TASK NO   A1

MONITOR   AFOSR
TR-86-0868

UNCLASSIFIED REPORT

ABSTRACT (U) Development of solution algorithms for complex flowfields is the continuing objective of the research. The physical events are used to determine appropriate subdomains for both preselected and adaptive divisions of the field. Adapted embedding procedures have been completed for two dimensional Euler flow with considerations of most suitable decision parameters. Development of an algorithm which combines cell and nodal centered features continues for applications to less restrictive embedded topology. A mixed implicit-explicit approach for different coordinate directions is under study for Navier-Stokes flow. The Dec 1984 Jerusalem workshop is summarized briefly. Keywords: Euler equations. Embedded grids, Adaptive grids, Airfoils, and Computational Fluid Dynamics.

DESCRIPTORS   (U)   :FLOW FIELDS, :AIRFOILS, :ALGORITHMS,
FLUID DYNAMICS COMPUTATIONS, TWO DIMENSIONAL FLOW,
NAVIER STOKES EQUATIONS, EMBEDDING, GRIDS, ADAPTIVE
SYSTEMS

IDENTIFIERS   (U)   Complex flow fields, Computational
fluid dynamics, Euler equations, Embedded grids, Adaptive
grids, PE61102F, WUAFOSR2307A1

AD-A172 727

AD-A172 732   20 11   13 13

NEW MEXICO UNIV ALBUQUERQUE DEPT OF MECHANICAL
ENGINEERING

(U) Structure Dynamic Theories of Fracture Diagnosis

DESCRIPTIVE NOTE   Technical rept. Jun-Dec 85.

MAR 86   137P

PERSONAL AUTHORS   Ju,Frederick D

REPORT NO   ME-134-85 AFOSR-993-2

CONTRACT NO   AFOSR 85 0085

PROJECT NO   2302

TASK NO   C2

MONITOR   AFOSR
TR 86 0890

UNCLASSIFIED REPORT

Availability: Document partially illegible

ABSTRACT   (U)   Two model theories of damage diagnosis are presented. The model theories of frequency theory are based on the change in modal frequencies of a structure due to damage. Can identify both the location and the intensity of damage for simple fracture modeling theories. The transmissibility theory which relates to changes in transmissibilities across a structure is proposed as a feasible method for large structures. The report reveals the transmissibility theory is illustrated with a frame structure in localizing a fracture damage.

DESCRIPTORS   (U)   :CRACKS, :BEAMS, :STRUCTURAL, :DAMAGE,
FRACTURE MECHANICS, DIAGNOSIS, GENERAL THEORY,
STRUCTURAL MECHANICS, ANALOGIES, CIRCUITS, FREQUENCY,
STRUCTURAL RESPONSE, EXCITATION, INTENSITY,
POSITION(LOCATION), CANTILEVER BEAMS, DAMPING

IDENTIFIERS   (U)   Modal frequency theory,
Transmissibility theory, Fracture damage, Analog circuit
analogy, Mechanical analogy, Damage diagnosis, PE61102F,
WUAFOSR2302C2

AD-A172 732

AD A172 716   21-2

VIRGINIA POLYTECHNIC INST AND STATE UNIV, BLACKSBURG
DEPT OF ENGINEERING SCIENCE AND MECHANICS

(U) Optimization of Closed Loop Eigenvalues Maneuvering,
   Vibration Control, and Structure Control Design
   Iteration for Flexible Spacecraft

DESCRIPTIVE NOTE: Final rept. Jun 85-May 86

MAY 86   151P

PERSONAL AUTHORS: Junkins,John L.

CONTRACT NO   F49620-83-K-0032

PROJECT NO   2302

TASK NO   B1

MONITOR: AFOSR
           TR-85-0905

                    UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Prepared in cooperation with Texas A
   and M Univ., College Station

ABSTRACT: (U)   This report summarizes new results on
   spacecraft dynamics and control. Perturbation methods are
   presented for computing nonlinear open and closed loop
   optimal maneuver control. Homotopy optimization
   algorithms are presented for tuning linear regulators vis-
   a-vis eigenvalue placement and robustness. A simultaneous
   structure/controller design optimization algorithm is
   developed. Keywords; active control; structural analysis;
   optimization integrated design; spacecraft dynamics.

DESCRIPTORS: (U)   *CONTROL SYSTEMS, SPACECRAFT, SPACE
   SYSTEMS, FLEXIBLE STRUCTURES, FLIGHT MANEUVERS, CLOSED
   LOOP SYSTEMS, OPEN LOOP SYSTEMS, NONLINEAR SYSTEMS,
   OPTIMIZATION ALGORITHMS, VIBRATION, CONTROL, EIGENVALUES

IDENTIFIERS   (U)   Large space structures, WUAFOSR2302B1,
   PE61102F

AD A172 716

AD A172 713   9-1   20-12

IOWA STATE UNIV, AMES

(U) Microwave Acoustics Device Study

DESCRIPTIVE NOTE: Final rept. 1 Sep 84-31 Aug 85.

JUL 86   49P

PERSONAL AUTHORS: Lakin,K. M.

CONTRACT NO.   AFOSR-84-0386

PROJECT NO.   2306

TASK NO   B2

MONITOR: AFOSR
           TR-86-0860

                    UNCLASSIFIED REPORT

ABSTRACT: (U)   This final report summarizes the results
   of a single one year study of the device physics aspects
   of the thin film bulk acoustic wave resonator. The study
   involved high Q trapped energy resonators, zinc
   diffusions in GaAs as a precursor to temperature
   coefficient studies, and refinements to the two
   dimensional numerical analysis modeling of microwave
   acoustic boundary value problems by the finite difference
   method. Keywords; Microwave acoustics, Thin film
   resonators, Bulk acoustic waves, Diffusion of Zn, and
   GaAs.

DESCRIPTORS: (U)   *RESONATORS, *THIN FILMS, *GALLIUM
   ARSENIDES, ZINC, FINITE DIFFERENCE THEORY, DIFFUSION

IDENTIFIERS: (U)   BAW(Bulk Acoustic Waves,
   Acoustics(Microwave), High Q resonators, Thermal
   coefficients. Mode trapping. WUAFOSR2306B2, PE61102F

AD A172 713

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A172 711   21 2   21/1

AD-A172 711   CONTINUED

combustors. Flame stabilization, Pressure interactions.
Turbulent reacting flow. WUAFOSR2308A2. PE61102F

SCIENCE APPLICATIONS INTERNATIONAL CORP CHATSWORTH CA
COMBUSTION SCIENCE AND ADVANCED TECHNOLOGY DEPT

(U) Pressure Interactions in Supersonic Combustion.

DESCRIPTIVE NOTE: Final rept   1 Jun 84-28 Feb 86.

JUN 86   58P

PERSONAL AUTHORS: Edelman,R. B   ;Bragg,W N

CONTRACT NO   F49620 84-C-0064

PROJECT NO   2308

TASK NO   A2

MONITOR   AFOSR
          TR 86 0875

UNCLASSIFIED REPORT

ABSTRACT   (U)   A detailed assessment of supersonic
combustion was carried out to identify specific research
requirements in modeling turbulent reacting supersonic
flows. The direct effects of pressure gradients and
pressure fluctuations on turbulence were found to be
potentially responsible for certain of the trends in
turbulent transport and mixing rates that are observed in
supersonic flows. An approach to the modeling of these
phenomena is delineated. A modular model computer code
for the analysis of sudden expansion dump combustors
was prepared. This modular model is designed to be used
parametrically in evaluating effects such as chemical
kinetic limitation on flame stabilization and combustion
efficiency in integral rocket ramjet and ducted rocket
combustors. Keywords: Pressure interactions. Turbulence
modeling. Sudden expansion combustors. Dump combustors.

DESCRIPTORS: (U)   :SUPERSONIC COMBUSTION :COMBUSTORS
:TURBULENT FLOW. SUPERSONIC FLOW. REACTION KINETICS.
TRANSPORT PROPERTIES. PRESSURE GRADIENTS. FLAME
PROPAGATION. MIXING. RATES. EFFICIENCY. FUEL INJECTION
DUCTED ROCKETS. INTEGRAL ROCKET RAMJETS. FLAMES.
STABILIZATION. PRESSURE VARIATIONS. INTERACTIONS.
MODULAR CONSTRUCTION. COMPUTER PROGRAMS

IDENTIFIERS   (U)   Dump combustion. Sudden expansion

AD-A172 711

AD A172 692   CONTINUED

CALIFORNIA UNIV. LOS ANGELES DEPT OF PHYSICS

U Characterization of Infrared Properties of Layer Semiconductors.

IDENTIFIERS   (U) Photo Induced Transient Spectroscopy
PE61102F WUAFOSR2305B1

*INFRARED SPECTROSCOPY. CZOCHRALSKI CRYSTALS. RAMAN
SPECTRA. LIGHT SCATTERING. FREQUENCY MODULATION. LOW
NOISE. SOLID STATE ELECTRONICS. FIELD EFFECT TRANSISTORS.
CHARGE COUPLED DEVICES. EPITAXIAL GROWTH

DESCRIPTIVE NOTE   Annual scientific rept   1 May 84 31 Aug
85

AUG 86   128P

PERSONAL AUTHORS   Braunstein, Rubin

CONTRACT NO   AFOSR-83-0169

PROJECT NO   2305

TASK NO   B1

MONITOR   AFOSR
TR 86 0851

UNCLASSIFIED REPORT

ABSTRACT   (U)   Infrared wavelength modulation absorption
spectroscopy was employed in the spectral range of 0.3-1
45 eV to study deep level impurities in undoped semi-
insulating GaAs grown by the liquid encapsulated
Czochralski technique. The sensitivity of the
measurements allow us to give credence to changes in
absorption at levels of .001/cm. The measurements reveal
two resonant type peaks with fine structures near 0.39
and 0.40 eV as well as plateaus and thresholds at higher
energy. The absorption band at 0.37 eV is interpreted as
due to the intra center transition between levels of
accidental iron impurity. The absorption band near 0.40
eV can be annealed out by heat treatment and is
characterize as belonging to a structural multi level
defect complex. Photo induced transient spectroscopy
technique also reveal out annealable level at 0.42 eV
Raman backscattering was employed to measure the shift in
the frequency of unscreened and screened phonon plasma
mode in GaAs in a study of the change in the surface
depletion layer widths due to various surface treatments
A technique of photo-mixing was employed to measure the
drift velocities in the hot carrier small distance
regimes in Goallium Arsenide.

DESCRIPTORS   U   *ABSORPTION SPECTRA. *GALLIUM ARSENIDES

AD A172 692

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 687   14/2   20/1   9/2   AD-A172 687   CONTINUED

KENTUCKY UNIV LEXINGTON WENNER-GREN RESEARCH LAB

(U) Signal Processing in Ultrasonic NDE (Nondestructive
Evaluation).

Filters, Coherent noise, Flaw sizes, Autoregressive
Models, Impulses, Homomorphic filters, Deconvolutions,
Spline Functions, PE61102F, WUAFOSR2306A2

DESCRIPTIVE NOTE: Final technical rept. 15 Aug 84-14 Nov
85.

JUL 86   47P

PERSONAL AUTHORS: Bhagat,Pramode K. ;Leon,Benjamin J. ;

CONTRACT NO   AFOSR-84-0223

PROJECT NO   2306

TASK NO   A2

MONITOR   AFOSR
TR-86-0904

UNCLASSIFIED REPORT

ABSTRACT: (U)   The desirable performance goal of an
ultrasonic nondestructive evaluation. NDE. methodology is
to reliable and rapidly obtain information regarding
flaws in the material being tested. Decisions concerning
acceptance rejection of material for further usage can
then be made on the basis of the nature and severity of
flaws within it. Flaw size estimates are currently made
on the basis of an idealized physical model, describing
the flaw which uses the computed impulse response as an
input. The research reported in this study seeks to
define the limits and sensitivities of currently
available deconvolution algorithms. In particular, the
interrelationship among parameters of deconvolution
procedures, noise, transducer bandwidth and
instrumentation related errors were studied. Simulation
experiments dealing with the impulse train recovery from
material samples are illustrated in an algorithmic manner
with the aid of a laboratory minicomputer system. (Author)

DESCRIPTORS   (U)   *NONDESTRUCTIVE TESTING, *ULTRASONICS,
*SIGNAL PROCESSING, *PROCESSING EQUIPMENT, DIGITAL
COMPUTERS, COMPUTER PROGRAMS, NOISE, SIMULATION, MOMENTUM,
SUPPRESSORS, TRANSDUCERS, BANDWIDTH, ALGORITHMS

IDENTIFIERS   U   NDE(NonDestructive Evaluation), Wiener

AD-A172 687

AD-A172 675   2 1 1   20 6   19 1

AD-A172 675   CONTINUED

MARYLAND UNIV COLLEGE PARK DEPT OF PHYSICS AND ASTRONOMY

(U) Coherent Scattering of Light by Nuclear Spins

DESCRIPTIVE NOTE   Final rept

JUN 86   44P

PERSONAL AUTHORS   Weber J

CONTRACT NO   F49620-81-C-0024, AFOSR-82-0164

PROJECT NO   2301

TASK NO   A8

MONITOR   AFOSR
TR-86-0908

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Prepared in cooperation with
California Univ, Irvine

ABSTRACT   (U) A new kind of coherent interaction is
possible for strongly coupled scatterers. The general
theory is presented and applied to the coherent
absorption of light by an ensemble of coupled nuclei,
with polarized spins. Three kinds of experiments have
been carried out, in which the coupling of scatterers
with each other is important. These are: a) Low energy
antineutrinos interacting with nuclei of a solid; b)
Raman scattering of light by electrons in a thin
conducting film on the surface of polarized dielectric;
and c) Interaction of light with polarized nuclei of a
crystal. For a), the theory is the interaction of two
current densities and the lowest order process is
antineutrino scattering. b) is a scattering process
described by the interaction of light with electrons, and
c) is an absorption process described by the interaction
of light with magnetic moments. All of these processes
may have total cross sections orders greater than the
corresponding ones for scatterers which are not tightly
bound. This appears true for all tightly bound scatterer
interactions.

·NUCLEAR SPINS, POLARIZATION, COUPLING(INTERACTION), LOW
ENERGY, CURRENT DENSITY, ELEMENTARY PARTICLES, ELECTRONS,
THIN FILMS, DIELECTRICS, CRYSTALS, SAPPHIRE, RESONANCE,
ABSORPTION, ABSORPTION CROSS SECTIONS, NUCLEAR MAGNETIC
RESONANCE, MOMENTUM TRANSFER, LASER BEAMS, NUMERICAL
METHODS AND PROCEDURES

IDENTIFIERS   (U) Raman scattering, Antineutrino
scattering, PE61102F, WUAFOSR2301A8

DESCRIPTORS   (U) *LIGHT SCATTERING, (COHERENT SCATTERING,

AD-A172 675

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A172 664   7/3

MICHIGAN UNIV ANN ARBOR DEPT OF CHEMISTRY

(U) The Exchange Reaction of Tetramethyldipnictogens with Dimethyldichalcogenides.

86   9P

PERSONAL AUTHORS: Ashe,Arthur J. III ;Ludwig,Edward G. Jr;

CONTRACT NO: AFOSR-81-0099

PROJECT NO: 2303

TASK NO: B2

MONITOR: AFOSR
TR-85-0909

UNCLASSIFIED REPORT

ABSTRACT: (U) Tetramethyldipnictogens Me4E2 (E = P, As, Sb, Bi) undergo exchange reactions with dimethyldichalcogenides MeA (A = S, Se, Te) to produce the corresponding dimethylpnicto methylchalcogenides Me2EAMe. These compounds have been characterized by NMR, Raman and mass spectroscopy.

DESCRIPTORS: (U) *ORGANOMETALLIC COMPOUNDS, *METHYL RADICALS, *CHALCOGENS, *EXCHANGE REACTIONS, PHOSPHORUS, ARSENIC, ANTIMONY, BISMUTH, SULFUR, SELENIUM, TELLURIUM, NUCLEAR MAGNETIC RESONANCE, MASS SPECTROSCOPY, REPRINTS

IDENTIFIERS: (U) Interelement compounds, WUAFOSR2303B2, PE61102F

AD-A172 616   9/2

DUKE UNIV DURHAM NC

(U) Numerical Evaluation of Performability and Job Completion Time in Repairable Fault-Tolerant Systems.

86   8P

PERSONAL AUTHORS: Kulkarni,V. G. ;Nicola,V. F. ;Smith,R. M. ;Trivedi,K. S. ;

CONTRACT NO: DAAG29-84-K-0045, AFOSR-84-0140

MONITOR: ARO,AFOSR
21055 19-EL,TR-86-2202

UNCLASSIFIED REPORT

ABSTRACT: (U) Fault-tolerant computer systems change their level of performance (e.g. mode of operation or service rate) in response to different events such as failure, degradation or repair. The author present a unified model for the analysis of job (task) completion time and the accumulated service (reward) until a given time (also known as performability). In prior work, the evaluation of the distribution of performability was restricted to nonrepairable systems (represented by acyclic Markov chains). This paper describes an algorithm for the numerical evaluation of the distributions of performability or job completion time, in repairable fault-tolerant systems (represented by cyclic Markov chains). This reprint demonstrates the feasibility of these techniques by means of numerical examples.

DESCRIPTORS: (U) *FAULT TOLERANT COMPUTING, *NUMERICAL ANALYSIS, PERFORMANCE(ENGINEERING), ALGORITHMS, MARKOV PROCESSES, RELIABILITY, REPAIR, MATHEMATICAL MODELS, MULTIPROCESSORS, REPRINTS

AD-A172 562   12.1

KOZIN BOGDANOFF AND ASSOCIATES INC WEST LAFAYETTE IN

(U) A Survey of Probabilistic Methods for Dynamical Systems with Uncertain Parameters.

DESCRIPTIVE NOTE: Final rept.

MAY 86   170P

PERSONAL AUTHORS: Bogdanoff,J L. ;Kozin,F. ;

CONTRACT NO: F49620-85-C-0139

PROJECT NO: 2302

TASK NO: B1

MONITOR: AFOSR
           TR-86-0830

UNCLASSIFIED REPORT

ABSTRACT: (U)   The purpose of this report is to present a survey of techniques that are available for studying the effect of random parameters on the response characteristics of linear dynamical parameters on the response characteristics of linear dynamical systems. The report is directed towards the properties of the solutions of ordinary linear differential equations with random parameters. Both time independent (constant) random parameters, and time varying parameter systems are discussed. The motivation is the study of structures with random parameters. Keywords: Stochastic process; Random vibrations; Structural response; Random parameters; Uncertain systems; Perturbation; and White nose coefficients. (Author)

DESCRIPTORS: (U)   *PROBABILITY, *PARAMETRIC ANALYSIS, DYNAMICS, LINEAR SYSTEMS, LINEARITY, PARAMETERS, STRUCTURAL RESPONSE, SURVEYS, LINEAR DIFFERENTIAL EQUATIONS, LINEAR SYSTEMS, SOLUTIONS(GENERAL), VIBRATION, STOCHASTIC PROCESSES, METHODOLOGY, TIME

IDENTIFIERS: (U)   WUAFOSR2302B1, PE61102F

AD-A172 562

PAGE   152   EVN54B

AD-A172 607   11   4 2

RESEARCH INST OF COLORADO FORT COLLINS

(U) Mesoscale Severe Weather Development under Orographic Influences.

DESCRIPTIVE NOTE   Final rept   1 May 85-30 Apr 86.

JUL 86   15P

PERSONAL AUTHORS   Reiter,Elmar R. ;Bresch,James F. ; Klitch,Marjorie A. ;MacDonald,Bruce C. ;Sheaffer,John D. ;

CONTRACT NO   F49620-85-C-0077

PROJECT NO   2310

TASK NO   A1

MONITOR   AFOSR
          TR-86-0880

UNCLASSIFIED REPORT

ABSTRACT   (U)   Overall goals of this 3-year study are to: 1) examine the role of topography in the development of convective systems and 2) assess the orographic influences on cold season severe weather, such as blizzards lee cyclogenesis. etc. Four approaches were taken to attain these goals: 1) Implementation of a field measurement program. 2) diagnostic studies of energy fluxes during various seasons. 3) numerical simulation of severe weather development, and 4) evaluation of model sensitivity of various physical processes. Progress has been made on all four of these fronts in the first year. Keywords: Mountains. Atmosphere models; Surface energy fluxes, Mesoscale numerical modeling; Atmospheric convection. Seasonal variations.

DESCRIPTORS   (U)   *CONVECTION(ATMOSPHERIC), *MOUNTAINS, *STORMS, TOPOGRAPHY, COLD WEATHER, ATMOSPHERE MODELS, MATHEMATICAL MODELS, ENERGY TRANSFER, METEOROLOGICAL DATA, FIELD TESTS, SEASONAL VARIATIONS

IDENTIFIERS   (U)   Blizzards, Lee cyclogenesis, Tibet, Mesoscale numerical modeling, Surface energy fluxes, Rocky Mountains, Tibetan Plateau, Severe weather, WUAFOSR2310A1, PE61102F

AD-A172 607

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 561   5/10   6/16   AD-A172 561   CONTINUED

EYE RESEARCH INST OF RETINA FOUNDATION BOSTON MA

(U) Final Technical Report on Contract FQ8671-83-0517 for
1 February 1983 - 31 January 1986.

MAR 86   29P

PERSONAL AUTHORS: Arend, Lawrence E.

CONTRACT NO   FQ8671-83-0517

PROJECT NO.   2313

TASK NO   A5

MONITOR   AFOSR
            TR 86-0845

UNCLASSIFIED REPORT

Availability   Document partially illegible

EFFECTS, GRADIENTS, SPATIAL DISTRIBUTION, GRADIENTS,
SPATIAL DISTRIBUTION, SUBSURFACE, COLORS, CONTRAST,
NONUNIFORM, REGIONS, STIMULI, REGIONS, PATTERNS, LINE OF
SIGHT, RETINA, IMAGES

IDENTIFIERS: (U)   PE61102F, WUAFOSR2313A5

ABSTRACT.   (U)   Low contrast, low spatial frequency
luminance sawtooth patterns look like luminance
staircases, with no brightness changes over the shallower
luminance slope. Brightness measurements at corresponding
points in different cycles of these patterns showed
substantial illusory brightness differences. Other
measurements showed that the illusion is not confined to
strictly subthreshold luminance gradients, but occur with
slightly suprathreshold gradients as well. In models
which attempt to explain these visual illusions the
visual system integrates over the thresholded gradient of
the stimulus distribution. The integration encounters
problems due to curl introduced by the nonlinear
threshold operator. Lightness measurements indicated that
these problems have a visual counterpart, further support
for the models. Several new illusion were found to result
from this nonlinear threshold for spatial gradient,
including patterns where gradients were perceived in
uniform regions and nonuniform stimulus regions were
perceived as uniform. Color constancy was measured for
multiple regions of the visual field under different
illuminants

DESCRIPTORS   (U)   EYE MOVEMENTS, VISION, ILLUSIONS,
BRIGHTNESS, MEASUREMENT, ILLUMINANTS, LUMINANCE, SLOPE,
NONLINEAR SYSTEMS, OPERATORS/PERSONNEL, THRESHOLD

AD-A172 561

RTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVN54B

AD-A172 558   AD-A172 558   CONTINUED

ROCKWELL INTERNATIONAL THOUSAND OAKS CA SCIENCE CENTER

(U) Low Density Ceramics Based on Open Cell
     Macrostructures Fabricated from Reticulated Polymer
     Substrates

DESCRIPTIVE NOTE   Final rept. 1 May 83-30 Apr 85.

JUN 86   27P

PERSONAL AUTHORS   Lange,F F ; Miller,K T

REPORT NO   SC5364 2FR

CONTRACT NO   F49620-83-C 0078

PROJECT NO   2303

TASK NO   A3

MONITOR   AFOSR
             TR-86 0844

UNCLASSIFIED REPORT

modulus. which ranged between 1 and 5 GPa. increased with
density and was higher for the healed materials The
critical stress intensity factor ranged between 10 and 80
kPam 1/2. increasing with elastic modulus Tensile
strength ranged from 0.1 to 0.8 MPa and appeared to be
related to processing variations and defects, which
included specimen to specimen density variations, cracks
within the cell struts and large regions fo missing cells
in the material with the smallest cell size

DESCRIPTORS   (U)   CERAMIC MATERIALS, POROUS MATERIALS.
FABRICATION, MECHANICAL PROPERTIES, LOW DENSITY, CELLS,
SIZES(DIMENSIONS), ALUMINUM OXIDES, ZIRCONIUM OXIDES,
SLURRIES, CERAMIC COATINGS, POWDERS, STRUTS, CRACKS,
EXPANDED PLASTICS, POLYURETHANE RESINS, SUBSTRATES,
PYROLYSIS, MODULUS OF ELASTICITY, TENSILE STRENGTH,
TOUGHNESS

IDENTIFIERS   (U) Reticulated polymer substrates,
Fracture toughness. PE61102F. WUAFOSR2303A3

ABSTRACT   (U)   Processing procedures, and resulting
mechanical properties. of open cell low density (relative
density less that 0.1) ceramic macrostructures were
investigated These macrostructures were fabricated by
slurry coating reticulated polymer substrates. Cracks in
the powder coating. which were produced during the
pyrolysis of the substrate. remained after powder
densification at high temperatures and were the major
cause of suboptimum properties. Additionally, lack of
slurry drainage during the coating process could fill
cells with powder which would differentially shrink
during densification. leaving large regions within the
macrostructure void of cell struts. This problem became
increasingly pronounced with decreasing cell size.
Mechanical properties were measured for a commercial
transformation toughened AL2O3/ZrO2 doped cell material
fabricated using reticulated polymer substrates with cell
sizes of 30 65. and 100 pores per inch. Approximately
half of the specimens were treated by the manufacturer in
an attempt to heal the partially cracked struts. The
relative density of all commercial materials ranged
between 7 and 12% of theoretical Mechanical properties
appeared to be independent of cell size. The elastic

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 549   11 2   20/11

AD-A172 549   CONTINUED

NORTHWESTERN UNIV EVANSTON IL DEPT OF CIVIL ENGINEERING

IDENTIFIERS: (U)   PE61102F. WUAFOSR2307C2

(U) Fracture Toughness of Fiber Reinforced Concrete.

DESCRIPTIVE NOTE: Final rept. Jun 82-Aug 85.

NOV 85   38P

PERSONAL AUTHORS: Shah, Surendra P.

CONTRACT NO   AFOSR-82-0243

PROJECT NO   2307

TASK NO   C2

MONITOR   AFOSR
         TR 86-0898

UNCLASSIFIED REPORT

ABSTRACT: (U)   A fracture mechanics based theoretical
model is presented to predict the crack propagation
resistance of fiber reinforced cement based composites.
Mode I crack propagation and steel fibers are treated in
the proposed model. The mechanism of fracture resistance
for FRC can be separated as subcritical crack growth in
matrix and beginning of fiber bridging effect; post
critical crack growth in matrix such that the net stress
intensity factor due to the applied load and the fiber
bridging closing stresses remain constant; and a final
stage where the resistance to crack separation is
provided exclusively by fibers. The response of FRC
during all these stages was successfully predicted from
the knowledge of matrix fracture properties and the pull-
out load vs slip relationship of single fiber. The model
was verified with the results of experiments conducted on
notched beams reported here as well as by other
researchers. Beams were loaded in a closed-loop testing
machine so as to maintain a constant rate of crack mouth
opening displacement.

DESCRIPTORS: (U)   FIBER REINFORCEMENT, REINFORCED
CONCRETE, CONSTANTS, RATES, CRACK PROPAGATION,
CRACKING(FRACTURING), RESISTANCE, BRIDGES, FIBERS,
TOUGHNESS, DISPLACEMENT, MOUTH, OPENING(PROCESS), CRACKS,
STRESSES, STRESS CONCENTRATION, SEPARATION, FIBERS,
SUBCRITICAL ASSEMBLIES, METAL FIBERS, STEEL

AD-A172 549

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AD-A172 546   CONTINUED

CALIFORNIA INST OF TECH, PASADENA

(U) Mechanisms of Exciting Pressure Oscillations in Ramjet
Engines

DESCRIPTIVE NOTE: Final rept. Aug 80-Sep 84

JUN 85   21P

PERSONAL AUTHORS: Culick,F E ;Marble,F E ;Zukoski,E.
E.

CONTRACT NO.   AFOSR 80-0265

PROJECT NO.   2308

TASK NO.   A2

MONITOR: AFOSR
TR-86-0640

UNCLASSIFIED REPORT

ABSTRACT: (U)   Analytical work devoted to the global
acoustics has been concerned with both linear and
nonlinear behavior. Good agreement has been found between
calculations of the mode shapes and data taken at the
Naval Weapons Center. Numerical calculations are in
progress to provide representation of the nonlinear
unsteady behavior of a normal shock wave in an inlet
diffuser, including viscous effects. Experimental
investigations of combustion have been carried out with
pressure, spectral line intensity and flow visualization
techniques in a burner equipped with a bluff body
flameholder. When the combustion is stable, the flow in
the flameholder shear layers has many of the
characteristics of isothermal shear layers. When unstable
combustion occurs, the shear layers are characterized by
large vortices which are shed from the flame holder lip.
The self-excited oscillations appear to result from a
coupling between the vortex production mechanism and
nonsteady heat addition in the vortex. Both steady and
nonsteady processes are being studied. Analytical studies
have been carried out to determine the combustion
augmentation for a flame distorted by a plane vortex, a
flame distorted by a vortex being stretched along its
axis and a burning vortex interacting with wall.

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

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AD-A172 543   CONTINUED

HAWAII INST OF GEOPHYSICS HONOLULU

(U) Hydrophone Investigations of Earthquake and Explosion
Generated High Frequency Seismic Phases

DESCRIPTIVE NOTE   Final rept. Oct 83 Sep 85.

APR 86   220P

PERSONAL AUTHORS   Walker Daniel A

CONTRACT NO   F49620 84-C 0003

PROJECT NO   2309

TASK NO   A2

MONITOR   AFOSR
         TR 86 0638

UNCLASSIFIED REPORT

Tuamotus Keywords Body waves, Spectral analysis,
Hydrophone recordings; Nuclear explosion detection,
Marine seismology. Guided phases.

DESCRIPTORS   (U) *SEISMIC WAVES, *NUCLEAR EXPLOSION
DETECTION, *DISCRIMINATION, SPECTRUM ANALYSIS,
EARTHQUAKES, EPICENTERS, MARINE GEOPHYSICS, UNDERGROUND
EXPLOSIONS, HYDROPHONES, DEEP OCEANS, PACIFIC OCEAN
PRIMARY WAVES(SEISMIC WAVES), HIGH FREQUENCY, PHASE,
GRAVITATIONAL FIELDS, OCEANIC CRUST, EARTH MANTLE,
SEISMIC DATA, PACIFIC OCEAN ISLANDS, SUBMARINE TRENCHES.
MICRONESIA, AMBIENT NOISE

IDENTIFIERS   (U) Marine seismology, Subduction zones,
Body waves(Seismology), Wake Island hydrophone Array,
Ocean basins, Western Pacific Ocean, PE61102F,
WUAFOSR2309A2

SUPPLEMENTARY NOTE   Original contains color plates: All
DTIC and NTIS reproductions will be in black and white.

ABSTRACT   (U)   Data from the Wake Island Hydrophone Array
has been used in studies related to the detection and
discrimination of underground nuclear explosions These
include 1 comparative studies of explosion phases from
sites at comparable epicentral distances in the highly
efficient propagational distance range of 60 deg to 90
deg 2 some preliminary estimates of detection level
thresholds, 3 estimates of deep ocean noise levels and
comparisons to quiet continental sites, 4
determinations of the stability of yield estimates, and
5 the location of significant earthquakes unreported by
both the NEIS and ISC but well recorded at great
distances by elements of the Wake array in the interior
and along the subducting margins of the western Pacific
Basin The unreported earthquakes in the southwest
Pacific have led, in part, to the discovery of a new
subduction zone   the Micronesian Trench Unreported
earthquakes in the interior of the basin and along its
subducting margins may also have associated gravitational
effects of Air Force relevance Finally, data from the
Wake array may been use ul in a partial resolution of the
large   eg   g   of 9 April 1984 and in the
analysis o   phases from underground explosions in the

UNITED TECHNOLOGIES RESEARCH CENTER EAST HARTFORD CT

(U) Investigation of Fuel Additive Effects on Sooting
Flames

DESCRIPTIVE NOTE: Final rept. 1 May 83-31 May 86.

JUL 86   126p

PERSONAL AUTHORS: Bonczyk, Paul A.

REPORT NO   UTRC R86 956545-F

CONTRACT NO   F49620-83-C-0113

PROJECT NO   2308

TASK NO   A2

MONITOR   AFOSR
TR 86 0851

UNCLASSIFIED REPORT

ABSTRACT   (U)   Measurements were limited to well defined
hydrocarbon air gaseous and prevaporized liquid-fueled
diffusion flames. Emphasis was given to alkaline-earth
salt additives in an ethylene-air flame, as well as to
ferrocene in a flame fueled by a prevaporized toluene/iso-
octane mixture. Nonperturbing laser/optical diagnostic
techniques were used to measure flame temperature, as
well as to relate changes in soot particulate size,
number density and volume fraction to additive type and
concentration. For the ethylene flame, additive
effectiveness was shown to vary from point-to-point in
the flame and to maximize in the direction of increasing
flame temperature. From the latter, and measured
concentrations of metal combustion species, MOH+ (M = Ba,
Sr, etc.), were concluded to be the particular species
critical to soot suppression. The data indicate additive
intervention at both early and late stages of soot
formation, but it was not possible to conclude early
intervention firmly for the alkaline-earths. An
experiment complementary to the foregoing was conducted
to test an often quoted hypothesis of soot suppression in
which metal induced increases in OH concentration are
presumed to enhance soot oxidation and removal. This was
found however not to be valid. The effect of the

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

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AD A172 518   CONTINUED

WASHINGTON UNIV ST LOUIS MO BEHAVIOR RESEARCH LAB

(U) A Psychophysiological Mapping of Cognitive Processes.

amplitudes reflects not only the number, but also the type of information processing resources demanded by a primary task.

DESCRIPTIVE NOTE: Final rept. 1 Mar 83 28 Feb 86.

JUN 86   157p

PERSONAL AUTHORS: Stern John A ; Goldstein Robert ;

CONTRACT NO. F49620 83 C 0056

PROJECT NO. 2313

TASK NO. A3

MONITOR: AFOSR
        TR 86 0852

DESCRIPTORS: (U) *PSYCHOPHYSIOLOGY, *COGNITION, BRAIN, ENGLISH LANGUAGE, INFORMATION PROCESSING, RESOURCES, MEMORY DEVICES, AMPLITUDE, MAPPING, HEART RATE, JAPAN, PHYSIOLOGICAL EFFECTS, RESPONSE(BIOLOGY), PROBES, STIMULI, HEMISPHERES, SIZES(DIMENSIONS), MEMORY/PSYCHOLOGY, CUES(STIMULI), PERCEPTION(PSYCHOLOGY), REACTION TIME, ATTENTION, PATTERN RECOGNITION, PERFORMANCE(HUMAN), ELECTROENCEPHALOGRAPHY

IDENTIFIERS: (U) ERP(Event Related Potentials), Evoked potentials, Eye blinks, Short term memory, WUAFOSR2313A4, PE61102F

UNCLASSIFIED REPORT

ABSTRACT: (U) The purpose of these studies was to map the psychophysiological concomitants of cognitive processes. To this end, a modified Sternberg paradigm was used in which the trials were divided into three parts, each beginning with a stimulus. The first or cue stimulus informed the subject as to the character of the following memory set. In studies 1 and 2, the cue simply specified the number of letters in the memory set (1, 3, or 5 in study 1, 2 or 6 in study 2; in study 3, the cue also indicated the character type of the letters, either English or Japanese; the latter essentially nonsense patterns for these subjects. The third or test letter called for a response as to whether or not it was a member of the memory set. Physiological responses were recorded were cues to the probe stimulus and to the irrelevant probe stimuli occurring in the interstimulus intervals, and to studies 1 and 2, heart rate and other parameters. In study 1, in the interval preceding the memory set, where attentional demands varied with set size, probe ERP P1-N1 amplitudes increased with set size. In study 2, probe stimuli were both visual and auditory so as to assess the specificity of the study 1 ERP effect. In the third study, examined the differences between left and right hemispheres of the brain in the anticipation of verbal English characters and nonverbal Japanese characters. These findings coupled with those of study 1, confirm that attention to probes evoked potential...

AD A172 518

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AD-A172 517   CONTINUED

SUBTITLE: (U) ANALYSIS (OR) OF CHEMICAL EXTINGUISHING
AND FUEL TECHNIQUES.

(U) Velocity Measurement by Pulsed Doppler

DESCRIPTIVE NOTE: Final rept. Sep 83-Sep 85

NOV 85   50

PERSONAL AUTHORS: Ewan,Bruce C. ;Swithenbank,J.

REPORT NO: HIC 435

CONTRACT NO: AFOSR-84-0374

PROJECT NO: 2308

TASK NO: A3

MONITOR: AFOSR
TR-86-0839

UNCLASSIFIED REPORT

TESTS-ORDNANCE. ROCKET ENGINES. SHORT RANGE(TIME).
TRAVERSING MECHANISMS. MEASUREMENT. MIXING. MOTIVATION.
PARTICULATES. COMBUSTION. SPATIAL DISTRIBUTION. VELOCITY.
DIAMETERS.

IDENTIFIERS: (U) WUAFOSR2306A3 PE61102F

ABSTRACT: (U)   The optical monitoring of fluid flows and
particulates has in a the past generally divided between
those methods which provides a single snapshot over a
wide field diameter and those which provide a continuous
record at a single point. Laser Doppler anemometry comes
into the latter category and it is clear that in order to
accumulate the same information on the spatial
distribution of velocity as wide field methods a
traversing of the field must be carried out. While this
is commonplace among users of LDA, it requires that the
velocity field be steady or at least reproducible in
short between tests, single firings or periodic systems.
The motivation behind the present program has stemmed
from the perceived need to overcome the single point
capability of LDA in certain cases of interest to USAF.
These were originally seen to be short rocket motor
firings, which typically last for only a few seconds, but
are now considered to include the growing area of time
dependent 3-D flow measurement. This letter is now known
to be at the heart of many simple combustion systems
involving large scale mixing

DESCRIPTORS: (U) ;FLUID FLOW. ;LASER ANEMOMETERS.
DOPPLER SYSTEMS. MONITORING. OPTICS. FIRING.

AD-A172 517

AD-A172 517

UNCLASSIFIED

AD-A172 482   13/13

COLORADO UNIV AT BOULDER DEPT OF CIVIL ENVIRONMENTAL AND
ARCHITECTURAL ENGINEERING

(U) Centrifugal and Analytical Modeling of a Buried
Flexible Culvert.

DESCRIPTIVE NOTE: Technical rept. 1 Sep 84-31 Aug 85.

OCT 85   244P

PERSONAL AUTHORS: Ni, Jim C.

CONTRACT NO.   AFOSR 84-0300

PROJECT NO.   2302

TASK NO.   C2

MONITOR   AFOSR
          TR-86-0850

UNCLASSIFIED REPORT

ABSTRACT   (U)   This report summarizes one phase of the
research on the modeling of buried structures by
centrifuge testing and by numerical methods. Testing in
the centrifuge makes it possible to simulate the gravity-
induced overburden pressure effects that dictate the soil
stiffness which in turn determine the soil-structure
phenomena. Scaled model testing in the centrifuge is used
in the project to validate analytical methods commonly used
to analyze soil-structure interaction problems. Data
obtained by testing a 4-in o.am pipe at 50 g under a
static surface pressure loading consist of radial
deflections and strains measured around the pipe. These
experiments were analyzed by a finite element program in
which different constitutive models were incorporated,
including a non-linear plastic model and an elasto-
plastic model. On the basis of comparison with centrifuge
test data, the suitability and accuracy of the different
analyses were assessed.

DESCRIPTORS   (U)   *CONDUITS, *PIPES, *STRUCTURAL RESPONSE.
ACCURACY, CENTRIFUGAL FIELDS, MATHEMATICAL MODELS.
CENTRIFUGES, TEST METHODS, FINITE ELEMENT ANALYSIS.
ELASTIC PROPERTIES, MATHEMATICAL MODELS, NONLINEAR
SYSTEMS, PRESSURE, SOILS, STIFFNESS, CHANNELS(WATERWAYS),
EXPERIMENTAL DATA, MODELS, PLASTIC PROPERTIES, DEFLECTION

AD-A172 482

AD-A172 507   13/3   20/11

COLORADO UNIV AT BOULDER DEPT OF CIVIL ENVIRONMENTAL AND
ARCHITECTURAL ENGINEERING

(U) Finite Elements and Localized Failure.

DESCRIPTIVE NOTE: Final technical rept. 1 Aug 82-31 Oct
85.

DEC 85   141P

PERSONAL AUTHORS: Willam,Kaspar J   Sture,Stein

CONTRACT NO.   AFOSR 82-0273

PROJECT NO.   2302

TASK NO.   C2

MONITOR   AFOSR
          TR-86-0848

UNCLASSIFIED REPORT

ABSTRACT   (U)   This project was comprised of research on
three different controlled post-peak experiments on plain concrete
specimens which were subjected to direct tension-
triaxial compression and direct shear. 2) Constitutive
work, homogenization of localized failure due to tensile
cracking and frictional slip in the form of the Composite
Fracture Model which describes the degradation of
strength within an elementary volume of a fracture energy
equivalent continuum, and 3) Computational work.
Stabilization of strain softening computations of
localized failure within solids subjected to tensile
cracking and/or shear faulting. keywords. strain
softening, concrete components, inglistic anisotropy.
experimental data.

DESCRIPTORS   (U)   *SHEAR PROPERTIES, *CONCRETE, *TENSILE
PROPERTIES, *COMPRESSIVE PROPERTIES, ANISOTROPY.
COMPUTATIONS, DEGRADATION, STRENGTH(GENERAL), TENSION.
FINITE ELEMENT ANALYSIS, FRAGILITY, SOLIDS, COMPRESSION.
COMPOSITE STRUCTURES, FRACTURE(MECHANICS), MODELS, PARTS.
VOLUME, ENERGY, CRACKS, SOFTENING, EXPERIMENTAL DATA

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(U.S. FOOD BIBLIOGRAPHY WEAPON CONTROL NO EVN54B

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INTERACTIONS BURIED STRUCTURES GRAVITY BACKFILLS
STATIC LOADS STATIC PRESSURE SURFACE PROPERTIES THESES
SOIL MECHANICS

IDENTIFIERS   U   Culverts PE611102F

AD A172 474   4/1

SRI INTERNATIONAL MENLO PARK CA

(U) High-Latitude Ionospheric Irregularities.

DESCRIPTIVE NOTE: Final rept 1 Mar 83-30 May 86

JUL 86   9P

PERSONAL AUTHORS: Vickrey,James F.

CONTRACT NO   F49620-83-K-0025

MONITOR: AFOSR
           TR-86-0853

UNCLASSIFIED REPORT

ABSTRACT: (U)   A brief summary of some of key results
involving the production, transport, and ultimate decay
of naturally occurring ionospheric plasma structure.
Keywords: Scintillation; Plasma structure; and High-
latitude ionosphere

DESCRIPTORS: (U) *PLASMAS(PHYSICS), *IONOSPHERIC
SCINTILLATIONS, IONOSPHERE, STRUCTURAL PROPERTIES, HIGH
LATITUDES, DECAY SCHEMES, RADAR REFLECTIONS

IDENTIFIERS: (U)   Harang Discontinuity, LPN-SRI-5741

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DTIC REPORT BIBLIOGRAPHY

AD-A172 470   21 5   20 13

MINNESOTA UNIV MINNEAPOLIS HEAT TRANSFER LAB

(U) Studies of Gas Turbine Heat Transfer: Airfoil Surface and End Wall.

DESCRIPTIVE NOTE: Annual progress rept 3 Jan 85-28 Feb 86

    APR 86   74P

PERSONAL AUTHORS: Eckert,E R. ;Goldstein,R. J. ;Simon,T W.

CONTRACT NO: F19620-85-C-0049

PROJECT NO: 2307

TASK NO: A1

MONITOR: AFOSR
           TR-86-0854

UNCLASSIFIED REPORT

ABSTRACT: (U)   This annual report documents progress at the University of Minnesota Heat Transfer Laboratory on the topic of heat transfer from gas turbine airfoil and end wall surface. Subtopics are: Curvature effects. End wall heat transfer and Near-end wall heat transfer. Curvature effects on turbulent transport are shown for a smooth, convex wall and for single-wall and cooled convex and concave walls. End wall mass and heat transfer coefficient contours show the .... the passage center and in outer vortex ......

DESCRIPTORS: (U)   *AIRFOILS, *GAS ...... , *HEAT
TRANSFER, *SURFACES, SURFACES ......PATCHES, CURVATURE,
CONVEX WALLS, TRANSPORT, TURBULENCE, HEAT TRANSFER
COEFFICIENT, FILM COOLING, GAS TURBINE STRUCTURES

IDENTIFIERS: (U)   End wall heat transfer, WUAFOSR2307A1.
PE61102F

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SEARCH CONTROL NO. EVN54B

AD-A172 433   7/3

GEORGIA UNIV ATHENS

(U) Reaction of 1,2,3-Triphenyl-1,2,3-triphosphaindan with Nonacarbonyldiiron and Dodecacarbonyltriiron Revisted. Structures of Three P3Fe3 Clusters.

DESCRIPTIVE NOTE: Journal article.

        85   9P

PERSONAL AUTHORS: Kyba,Evan P. ;Hassett,Karen L. ;Sheikh, Baharuddin ;McKennis,Jeffrey S. ;King,R. B. ;

CONTRACT NO: AFOSR-84-0050

PROJECT NO: 2303

TASK NO: B2

MONITOR: AFOSR
           TR-86-0762

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Organometallics, v4 n6 p994-1001 1985.

ABSTRACT: (U)   The reaction of 1,2,3-triphenyltriphosphaindan with nonacarbonyldiiron or dodecacarbonyltriiron occurs rapidly in benzene at reflux to give a mixture of at least five components as monitored by HPLC. In addition to -1,2-PHENYLENEBIS(PHOSPHIDO) hexacarbonyldiiron and octacarbonyl 1,2,3-triphenyl 1,2,3-triphosphaindan k superscript P1,K superscript P3 diiron-O , three Fe3 species were isolated and their structures determined by X-ray crystallography, two of which were P3Fe3 clusters and the other, a P3Fe3 cluster precursor. keywords: Iron. Phosphines, and Metal carbonyls.

DESCRIPTORS: (U) *CHEMICAL REACTIONS, *PHOSPHINE,
*ORGANOMETALLIC COMPOUNDS, *METAL CARBONYLS, BENZENE,
CRYSTALLOGRAPHY, X RAYS, IRON, CLUSTERING, REPRINTS

IDENTIFIERS: (U)   WUAFOSR2303B2, PE61102F

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DTIC REPORT BIBLIOGRAPHY

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PRINCETON UNIV   NJ DEPT OF MECHANICAL AND AEROSPACE ENGINEERING

(U) Fuels Combustion Research

DESCRIPTIVE NOTE: Final rept. 1 Mar 82-30 Sep 85.

DEC 85   42P

PERSONAL AUTHORS: Dryer,Frederick L. ;Glassman,Irvin ; Williams,Forman A. ;

REPORT NO   MAE 1731

CONTRACT NO   F49620-82-K-0011

PROJECT NO   2308

TASK NO   A2

MONITOR   AFOSR
           TR 86-0841

UNCLASSIFIED REPORT

methods. Experimentally, a technique to produce isolated slurry fuel droplets of boron and JP-10 has been developed, and observations on the isolated droplet combustion characteristics of several commercially prepared boron/JP-10 slurries were made.

DESCRIPTORS: (U) *COMBUSTION, *SLURRY FUELS, *VAPORIZATION, ALKYL RADICALS, BENZENE, BORON, DIFFUSION, FLAMES, FUELS, MIXTURES, HIGH ENERGY, PROPELLANTS, SLURRIES, PYROLYSIS, STRUCTURAL PROPERTIES, DROPS, ISOLATION, LIQUIDS, MIXING, RIGIDITY, PATTERNS, SYNERGISM, PATTERNS, SURFACES, OXIDATION, PURITY, RATES, REACTION TIME, PERTURBATIONS, INTERNAL, THERMAL CONDUCTIVITY, TRANSIENTS, AROMATIC COMPOUNDS, REACTION KINETICS, JET ENGINE FUELS

IDENTIFIERS: (U) Slurry propellants, Aromatic fuel oxidation, Fuel pyrolysis, Alkylated benzenes, Boron fuels, Jp-10 fuel, PE61102, WUAFOSR2308A2

ABSTRACT: (U) The qualitative mechanisms for the oxidation of benzene and alkylated benzenes corresponds well with flow reactor results. Major results have been obtained on how the aromatic sidechain reacts and specific fundamental reaction rate data have been obtained. A fundamental correlation with respect to fuel C-C bonds for the sooting tendency of fuels under premixed combustion conditions has been developed and the concept that fuel structure plays no direct role in determining the critical sooting equivalence ratio was put forth and substantiated by results on pure fuels and fuel mixtures. Fuel structure and pyrolysis mechanisms have been found to be the important controlling factors in sooting diffusion flames. From a knowledge of basic pyrolysis studies, it is now possible to predict a fuel's reveal no synergistic trends with diffusion flame sooting trends; however, these trends may be due to the structural aspects of these flames. Experimental and theoretical research efforts on high-energy-density slurry propellants are reported. Transient internal heat conduction and liquid surface regression of a rigid slurry droplet during liquid vaporization and combustion have been investigated using singular perturbation

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AD-A172 426   7 4   20/8

SRI INTERNATIONAL MENLO PARK CA

(U) Surface Generation of Electronically Excited States of
     O2

DESCRIPTIVE NOTE. Final scientific rept.

JUL 86   71P

PERSONAL AUTHORS: Slanger, Tom G.

REPORT NO. SRI-MP 86 130

CONTRACT NO. F49620 82-K-0025

PROJECT NO. 2303

TASK NO. A2

MONITOR. AFOSR
          TR 86 0849

UNCLASSIFIED REPORT

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useful in guiding the investigations as subsequent in
situ experiments have been carried out. By consideration
of the present status of the observations, it has been
found possible to clarify which of the current
explanations of the glow-forming mechanism are viable,
and which must be discarded.

DESCRIPTORS.   (U)   *SURFACE REACTIONS, *ELECTRONIC STATES,
*OXYGEN, ATOMS, EMISSION, METASTABLE STATE, MOLECULES,
DISTRIBUTION, ENERGY, INTERNAL, LABORATORY PROCEDURES,
SPECIFIC HEAT, EXCITATION, INTERACTIONS, VAPOR PHASES,
LABORATORY TESTS, METALS, SURFACES, SPACE SHUTTLES, GLOW
DISCHARGES, MOLECULAR VIBRATION, EMISSION SPECTRA,
SURFACE TEMPERATURE, ALLOYS, RECOMBINATION REACTIONS,
PRODUCTION, TEMPERATURE

ABSTRACT   (U)   This investigation of surface-related
processes consisted of two parts, laboratory studies of
the production and loss of electronically excited oxygen
species on metallic surfaces, and an investigation of the
mechanisms that might contribute to the so-called Space
Shuttle glow. In the laboratory work, production by atom
recombination of the states of O2 that lie between 4 and
5 eV was studied. The efficiency of their generation was
correlated with the identity of the metal, its position
on the periodic chart, surface temperatures, alloy
composition, and the electronic heat capacity. Spectra of
the emissions originating at the surfaces were shown to
be non-specific to the particular metal, implying that
internal energy distributions in the emitting metastable
molecules were determined by gas phase interactions.
Further study of surface energy accommodation, and the
possible generation of highly vibrationally excited
molecules is called for. The loss of O2 on metallic
surfaces was investigated, and showed both similarities
and differences with the production of the higher O2
states on the same surfaces. Metals in a given group of
the periodic chart tend to exhibit similar temperature
effects. For Space Shuttle glow study involved
development of a model for the process, which has been

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AD-A172 397   7/3   7/4

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

CINCINNATI UNIV OH DEPT OF CHEMISTRY

(U) Ground States of Molecules 64 MNDO Calculations for
Compounds Containing Bromine.

(U) Molecular Orbital Conformational Energy Calculations
of the Aromatic Heterocyclic Poly(5,5'-Bibenzoxazole-2,
2'-Diyl-1,4,-Phenylene) and Poly(2,5-Benzoxazole).

83   11C

OCT 85   6P

PERSONAL AUTHORS: Dewar,Michael J. ;Healy,Eamonn .

PERSONAL AUTHORS: Welsh,W. J. ;Mark,J E. ;

CONTRACT NO F49620-82-C-0024

CONTRACT NO. AFOSR-83-0027

PROJECT NO 2303

PROJECT NO. 2303

TASK NO B2

TASK NO. A3

MONITOR AFOSR
TR 86 0712

MONITOR: AFOSR
TR-86-0706

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT: (U) MNDO has been parametrized for bromine
Since d atomic orbitals (AOs) are not included, the
calculations are restricted to Br superscript I. Heats of
formation, molecular geometries, ionization energies, and
dipole moments are reproduced with useful accuracy.

ABSTRACT: (U) Interest in potential high-performance
polymers, leading to characterization and development of
the rodlike poly(p-phenylene benzobisoxazoles) (PBO) and
poly(p-phenylene benzobisthiazoles) (PBT) has recently
been extended to a related group of polymers referred to
as AAPBO, ABPBO, AAPBT, and ABPBT. In this study,
geometry-optimized CNDO/2 molecular orbital calculations
have been carried out on AAPBO and ABPBO model compounds
to determine conformational energies as a function of
rotation about each type of rotatable bond within the
repeat units. For AAPBO, which contains two types of
rotatable bonds per repeat unit, the bond between the
benzoxazole group and p-phenylene group prefers the
coplanar conformation with a barrier to free rotation of
2.1 kcal/mol, while the bond between the benzoxazole
groups prefers a conformation approximately 60 degrees
away from coplanarity with a barrier to coplanarity and
to free rotation of 3.6 kcal/mol. For ABPBO, which
contains only the former type of rotatable bond per
repeat unit the coplanar conformations were preferred
with a barrier to free rotation of 1.6 kcal/mol. These
results are in excellent agreement with the results of
both theoretical and experimental studies on the
structurally analogous PBO. They are also consistent with

DESCRIPTORS: (U) *GROUND STATE, *QUANTUM CHEMISTRY,
*BROMINE, ACCURACY, ATOMIC ORBITALS, MOLECULES, GEOMETRY,
MOLECULAR PROPERTIES, DIPOLE MOMEN S, ENERGY, IONIZATION,
HEAT OF FORMATION, IONIZATION POTENTIALS, REPRINTS

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2

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the liquid crystalline behavior found for ABPBO but not   CINCINNATI UNIV OH DEPT OF CHEMISTRY
for ABPBO (Reprints)

                                       (U) A Theoretical Study of Conformations and Electronic
DESCRIPTORS   (U) *BENZOXAZOLES, *LIQUID CRYSTALS,   Band Structures for Two Benzoxazole Polymers.
*MOLECULAR ORBITALS, BONDED JOINTS, COMPUTATIONS,
AROMATIC COMPOUNDS, CONFORMITY, ENERGY FUNCTIONS,   85   9P
PERFORMANCE ENGINEERING, PLANAR STRUCTURES, POLYMERS,
REPRINTS, ROTATION, HETEROCYCLIC COMPOUNDS,   PERSONAL AUTHORS: Nayak,Kasinath ;Mark,James E. ;

IDENTIFIERS   (U) CNDO/2 Molecular Orbitals, Phenylenes,   CONTRACT NO.   AF OSR 83 0027
Benzoxazole Poly-2,5 Phenylene Poly-55 Bibenzoxazole 2
2 Diyl 1,4, PE611O2F, WUAFOSR2303A,   PROJECT NO.   2303

                                                            TASK NO.   A3

                                                            MONITOR: AFOSR
                                                                         TR-86-0705

                                                                UNCLASSIFIED REPORT

ABSTRACT: (U)   The extended Huckel method within the
tight-bonding approximation was applied to two
benzoxazole polymers of a type much studied because of
their excellent mechanical properties. Specifically, band
structure calculations were carried out in part to
identify the most stable conformation of the polymers in
the crystalline state. In the preferred conformation of
one polymer the rotational angle between the
bibenzoxazole groups is 20 degs., and that between the
bibenzoxazole group and the p-phenylene group is 0 degs.
The other polymer consists simply of benzoxazole groups,
and these are predicted to be coplanar. The above
conformational predictions are in excellent agreement
with the results of both experimental and theoretical
studies on relevant model compounds. In addition, the
band gaps in the axial direction were found to be 1.86
and 2.31 e/v, respectively, and these values are close to
the corresponding experimental values 1.4 to 1.8 eV
reported for trans-polyacetylene. In both benzoxazole
polymers the band gap was found to increase with increase
in nonplanarity due to the concomitant reduction in
charge delocalization.

DESCRIPTORS   (U) *ELECTRONIC STATES, *ENERGY BANDS,
*BENZOXAZOLES, *POLYMERS, STABILITY, ENERGY GAPS,

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AD-A172 396 (CONTINUED)

CRYSTALS MECHANICAL PROPERTIES ANGLES ROTATION THEORY CONFORMITY BAND THEORY OF SOLIDS SEMICONDUCTORS POLYPHENYLENES REPRINTS

IDENTIFIERS (U) PE61102F WUAFOSR2303A2

AD A172 396

AD-A172 395   7/4   4/1

JOINT INST FOR LAB ASTROPHYSICS BOULDER CO

(U) Branching Ratios for Electronically Excited Oxygen Atoms Formed in the Reaction of N+ with O2 at 300K.

86   11P

PERSONAL AUTHORS: Langford,Andrew O. ;Bierbaum,Veronica M. ;Leone,Stephen R.

CONTRACT NO. F49620-83-C-0013

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR TR-86-0742

UNCLASSIFIED REPORT

ABSTRACT: (U) Absolute branching ratios for production of $O(^{3}P)$, $O(^{1}D)$, and $O(^{1}S)$ in the reaction of N(+) with O2 are measured using the flowing afterglow/visible chemiluminescence technique. The $O(^{1}S)$ product is monitored by the $O(^{1}S)$-$O(^{1}D)$ emission at 557.7 nm. The $O(^{1}D)$ product is monitored via sensitized fluorescence at 760 nm from $O2(^{1}\Sigma g +)$ formed by energy transfer from $O(^{1}D)$ to $O2(X ^{3}\Sigma g-)$. Absolute $O(^{1}D)$ and $O(^{1}S)$ yields of 70 + or - 30% and <0.1%, respectively, of the total atomic oxygen product are inferred by comparison to the known $O(^{1}S)$ and $O2(^{1}\Sigma g +)$ emission intensities from the reaction of $Ar(^{3}P)$ with O2. The low $O(^{1}S)$ yield is also obtained directly from the relative $O(^{1}S)$ and $O2(^{1} \Sigma g +)$ emission intensities from the title reaction. A qualitative reaction mechanism consistent with these observations is presented. Keywords: Electron excitation; Ion-molecule reaction; and Flowing afterglow.

DESCRIPTORS: (U) *OXYGEN, *AFTERGLOWS, *CHEMILUMINESCENCE, *NITROGEN, *AIRGLOW, ELECTRONS, ATOMS

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SEARCH CONTROL NO. EVN54B

AD A172 394   12/1   9/2

CLEMSON UNIV SC DEPT OF MATHEMATICAL SCIENCES

(U) Iterative Algorithms for Generating Minimal Cutsets in
    Directed Graphs.

86   16P

PERSONAL AUTHORS: Shier,D. R. ;Whited,D. E. ;

CONTRACT NO.   AFOSR-84-0154

PROJECT NO.   2304

TASK NO.   A5

MONITOR: AFOSR
            TR-86-0780

                        UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Networks, v16 p133-147 1986.

ABSTRACT: (U)   Several approaches for evaluating network
    reliability require the generation of all minimal cutsets
    in a directed graph. A general iterative algorithm, based
    on an underlying algebraic structure, is proposed for
    generating all minimal s-j cutsets simultaneously for all
    vertices j in such a graph. In order to implement this
    algorithm in an efficient manner and to exploit sparsity
    present in the graph, a number of computational
    simplifications are developed leading to improved
    performance of the algorithm. Empirical results show that
    the choice of certain data structures can have a profound
    effect on the computational effort required. (Reprints)

DESCRIPTORS: (U)   'GRAPHS, 'COMPUTER PROGRAMMING, ALGEBRA,
    ALGORITHMS, DATA BASES, ITERATIONS, NETWORKS, RELIABILITY,
    REPRINTS, STRUCTURAL PROPERTIES, OPTIMIZATION

IDENTIFIERS: (U)   PE61102F, WUAFOSR2304A5

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EXCITATION, RATIOS, ENERGY TRANSFER, IONS, MOLECULES,
RESPONSE, FLUORESCENCE, EMISSION SPECTRA, REPRINTS

IDENTIFIERS   (U)   PE61102F, WUAFOSR2304B1

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO EVN54B

AD-A172 391   7/4

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

(U) A Simple Inexpensive Computer-Controlled Slew-Scan Atomic Fluorescence Flame Spectrometer for Multi-Element Determinations.

85   14P

PERSONAL AUTHORS: Davis,Lori A. ;Krupa,R. J. ;Winefordner, J. D. ;

CONTRACT NO.   F49620-84-C-0002

PROJECT NO.   2303

TASK NO.   A1

MONITOR: AFOSR TR-86-0760

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Analytica Chimica Acta. v173 p51-62 1985.

ABSTRACT: (U)   The system consists of a continuum xenon arc lamp source, a chopper, and argon-separated air, acetylene flame atomizer, a high-throughput, medium-resolution grating monochromator under Apple II+ wavelength control, a photomultiplier detector, and a photon counter with an Apple II+ for data collection and statistical treatment. The computer-controlled system is shown to give semi-quantitative results (within + or - 50%) for 19 elements at two wavelengths each (one wavelength for 7 elements) in less than 15 min. quantitative results (within + or - 5%) for each element at a selected wavelength were obtained in about 5 min. The system was characterized by determining 10 and 14 elements in synthetic mixtures and by determining a number of elements in NBS standard reference materials (orchard leaves and two steels).

DESCRIPTORS: (U)   *SPECTROMETERS, *ATOMIC SPECTROSCOPY, *COMPUTER APPLICATIONS, FREQUENCY, FLUORESCENCE, MATERIALS, DATA ACQUISITION, STEEL, DETECTORS, PHOTOMULTIPLIER TUBES, MIXTURES, SYNTHETIC MATERIALS, XENON LAMPS, ARC LAMPS, CHEMICAL ELEMENTS, REPRINTS

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SEARCH CONTROL NO

AD-A172

TEXAS UNIV ... DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) A Stability Property of Conditional Expectations.

APR 86   5P

PERSONAL AUTHORS: Morrison,John M. ;Wise,Gary L. ;

CONTRACT NO   AFOSR-81-0047

PROJECT NO   2304

TASK NO   A5

MONITOR   AFOSR TR-86-0792

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in the Proceedings of the Conference on Information Sciences and Systems (1985) Held in Baltimore, MD on 27-29 Mar 85, p226-229.

ABSTRACT: (U)   This paper is concerned with approximating a conditional expectation of a second order random variable given a random process defined over an interval by a conditional expectation of the random variable given distorted values of the random process at finitely many times. A sufficient condition which guarantees a good approximation is presented. Best estimates of more general fidelity criteria than mean square error are also considered, and the above situation is addressed for a wide class of fidelity criteria. Keywords: Nonlinear estimation.

DESCRIPTORS: (U)   *RANDOM VARIABLES, DISTORTION, VALUE, ERRORS, MEAN, STABILITY, GUARANTEES, ESTIMATES, NONLINEAR ANALYSIS, APPROXIMATION(MATHEMATICS),

IDENTIFIERS   (U)   PE61102F, WUAFOSR2304A5

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AD-A172 390   7/3

GEORGIA UNIV ATHENS

(U) Metal Carbonyl Complexes of Bis(Diisopropylamino)-
Phosphine and Diisopropylaminochlorophosphine.

DESCRIPTIVE NOTE: Journal article.

84   4P

PERSONAL AUTHORS: King,R. B. ;Fu,W. K. ;

CONTRACT NO.   AFOSR-84-0050

PROJECT NO.   2303

TASK NO.   B2

MONITOR.   AFOSR
TR-86-0757

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Organometallic
Chemistry, v272 pC33-C35 1984.

ABSTRACT: (U)   Reactions of (i-Pr2N)2PH with the
tetrahydrofuran (THF) metal carbonyl complexes (THF)M(CO)
5 (M=Cr, Mo, and W), (THF)Fe(CO)4, and (THF)Mn(CO)2C5H5
give (i-Pr2N)2PHM(CO)5 (M=Cr, Mo, and W), (i-Pr2)
2PHFe(CO)4, and (i-Pr2N)2PHMn(CO)2C5H5 respectively. One
of the diisopropylamino groups in these complexes can be
selectively cleaved with hydrogen chloride to give the
complexes (i-Pr2NP(H)ClM(CO)4H(Cl)M(CV1 C(5 (M=Cr, Mo, and W) and i
Pr2NP(H)ClFe(CO)4 containing the unknown phosphorus
compound i-Pr2NP(H)Cl as a ligand.

DESCRIPTORS: (U)   *PHOSPHINE, *CHEMICAL REACTIONS, *METAL
CARBONYLS, HYDROGEN CHLORIDE, FURANS, HYDROXYL RADICALS,
METAL COMPLEXES, ORGANOMETALLIC COMPOUNDS, IRON, CHROMIUM
MOLYBDENUM, TUNGSTEN, REPRINTS

IDENTIFIERS: (U)   PE61102F, WUAFOSR2303B2

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IDENTIFIERS   (U)   PE61102F, WUAFOSR2303A1

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NORTH TEXAS ... DEPT OF ...   AL A1... 385   14 4   12

(U) Silicon ... Bonds. 9. The Synthesis of   ARIZONA UNIV TUCSON DEPT OF MATHEMATICS
Polystannates ... Bis group (14) Substituted
Cyclopentadienes via a Novel Cleavage Reaction of   (U) Lifetime Distribution of Consecutive-k-out-of-n F
Silicon Carbon Bonds by Chloride Ion.   Systems with Exchangeable Lifetimes.

85   5P   DEC 85   5P

PERSONAL AUTHORS: Pozell, James M.,   PERSONAL AUTHORS: Shanthikumar, J. G.
Jr., Jones, Paul R.

CONTRACT NO: AFOSR 83-0244   CONTRACT NO: AFOSR 84-0205

PROJECT NO: 2303   PROJECT NO: 2304

TASK NO: B2   TASK NO: A5

MONITOR: AFOSR   MONITOR: AFOSR
TR-86-0756   TR-86-0709

UNCLASSIFIED REPORT   UNCLASSIFIED REPORT

ABSTRACT: (U) Group 14 substituted cyclopentadienes or   ABSTRACT: (U) Algorithms for computing the lifetime
the type C5H5 MMe2X (M=Me2Y, M=Si or Ge; X   distributions of consecutive-k-out-of-n F systems with
and/or Y=Cl or Me) can be prepared in good yields by   statistically independent, and statistically exchangeable
the reaction of n-butyl lithium with   component lifetimes are presented. A load-sharing model
cyclopentadienyltrimethylsilane followed by treatment   for statistically exchangeable component lifetimes and
with Me2MCl2 (M=Si or Ge). In hexane the reaction gives   the effects of minimal repair on system lifetime are
1=M=Si, M=Si or Ge; X=Me, Y=Cl). In THF, with   considered. (Author)
excess Me2MCl2 lithium chloride catalyzed cleavage of
the trimethylsilyl group occurs to give excellent yields
of (1=M and M=Si or Ge; X and Y=Cl). Methanolysis
gives (1=M=Si or Ge; X=Y=OMe). The cleavage
reaction occurs only in THF and when the substrate bears
a chlorodimethylsilyl or -germyl substituent

DESCRIPTORS: (U) *SYNTHESIS(CHEMISTRY), *PENTADIENES,   DESCRIPTORS: (U) *ALGORITHMS, *LIFE EXPECTANCY/SERVICE
*POLYMERS, *CYCLIC COMPOUNDS, CHEMICAL BONDS, CATALYSIS,   LIFE, *PARTS, *RELIABILITY, FAILURE, SYSTEMS ENGINEERING,
LITHIUM SILANES, CHLORIDES, IONS, CLEAVAGE, RESPONSE,   LIFE SPAN(BIOLOGY), PROBABILITY, PERFORMANCE(ENGINEERING),
LITHIUM CHLORIDE, HEXANES, CARBON, SILICON   REPAIR

IDENTIFIERS: (U) PE61102F, WJAFOSR2303B2   IDENTIFIERS: (U) PE61102F, WUAFOSR2304A5

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AD-A172 363   7/3

GEORGIA UNIV ATHENS DEPT OF CHEMISTRY

(U) Tetrakis(dialkylamino)Cyclotetraphosphines and
Bis(dialkylamino)Dihalobiphosphines.

85   6P

PERSONAL AUTHORS: King,R B. ,Sadanani,Narayan D. :

CONTRACT NO   AFOSR-84-0050

PROJECT NO   2303

TASK NO   B2

MONITOR AFOSR
TR-86-0759

UNCLASSIFIED REPORT

ABSTRACT   (U)   Dehalogenation of R2NPCl2 (R = isopropyl
or cyclohexyl) with magnesium in tetrahydrofuran gives
the corresponding cyclotetraphosphines (R2N-4P4 the
corresponding biphosphines (i-Pr2N-2P2X2 X = Cl and Br)
can be isolated from reactions of i-Pr2NPX2 with more
limited quantities of magnesium. Dehalogenations with
magnesium of R2NPCl2 derivatives having R2N groups
smaller than diisopropylamino lead to redistribution of
the dialkylamino groups giving (R2N-2P-P-NR2)2 (R2N =
piperidino or (R2N-3P (R2N = diethylamino or
dimethylamino). Such redistribution reactions can be
suppressed but not eliminated by using the homogenous
dehalogenating agent (Me3Si)2Hg in hydrocarbon solvents
The steric bulk of the diisopropylamino groups in i-Pr2N-
4P4 reduces its chemical reactivity relative to other
cyclotetraphosphines, thus i-Pr2N4P4 is unreactive
toward oxygen, carbon disulfide, potassium metal, and
various metal carbonyls E.G. Cr(CO)6, Mo(CO)6, and
Fe2(CO)9 under conditions where other
cyclotetraphosphines react with these reagents. However,
the P4 ring in i-Pr2N4P4 is cleaved under mild
conditions by hydrogen chloride as well as by bromine and
iodine

DESCRIPTORS   (U)   *PHOSPHINE *SYNTHESIS(CHEMISTRY)

AD-A172 363

DTIC REPORT BIBLIOGRAPHY

AD-A172-383   7/3

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

Picosecond Laser Studies on the Effect of Structure
and Environment on Intersystem Crossing in Aromatic
Carbones

84   5P

PERSONAL AUTHORS: Sitzmann E. V. ,Langan J. G. ,Ho D. :

CONTRACT NO   AFOSR-84-0012

PROJECT NO

TASK NO

MONITOR

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub. in Ultrafast Phenomena v4 p330
1985

ABSTRACT
[illegible abstract text regarding substituent effect on the rate
of the intersystem crossing in the aromatic
...solvent polarity is...
...on S sub ST...
...energy gap changes...
...intersystem crossing...]

DESCRIPTORS   *OPTICAL
*KINETICS
*SOLVENTS

Carbenes Dipthenyl Picosecond time
Intersystem crossing Electrons

AD-A172-383

AD-A172 359   7 4   20 2

OKLAHOMA STATE UNIV STILLWATER DEPT OF CHEMISTRY

(U) Effect of Lattice Potential Upon the Surface Diffusion
of Si on Si(100)

DEC 85   5P

PERSONAL AUTHORS: NoorBatcha, I. ;Raff,Lionel M. ;Thompson,
Donald L .

CONTRACT NO   AFOSR-82-0311

PROJECT NO.   2303

TASK NO.   A2

MONITOR: AFOSR
           TR-86-0599

UNCLASSIFIED REPORT

ABSTRACT: (U)   The surface diffuision of silicon atoms on
Si(100) is examined using three different lattice
potentials. Jump frequencies of Si atoms between adjacent
adsorption sites are computed on each potential surface
at 800, 1000, 1200, and 1500 K using classical trajectory
methods. Diffusion coefficients are obtained directly
from the jump frequencies and activation parameters from
Arrhenius plots of the diffusion coefficients. The
activation energy obtained in our previous calculations
using Weber's lattice potential is shown to be too small
due to a lattice force field whose force constants are
too large by about 25%. The best results are obtained
with the Keating potential. This surface gives an
activation energy of 7.47 kcal/mol for Si diffusion on
Si(100). This result, coupled with the ratio of
activation energies for Si(100) and Si(111) surfaces
obtained in our previous studies, suggests an activation
energy of 5.25 kcal/mol for Si diffusion on Si(111). This
is in very good accord with the measured value of 4.6
kcal/mol obtained in ultrahigh vacuum deposition of
silicon. (Reprints)

DESCRIPTORS: (U)   *DIFFUSION, *SILICON, *CRYSTAL LATTICES,
*SURFACE REACTIONS, ACTIVATION ENERGY, ACTIVATION.

AD-A172 359

(left column, faint)

PROGRAMS ...

CHEMISTRY ... ORGANIC CHEMISTRY, REACTIONS, HYDROGEN
RADICALS AND ... MAGNESIUM OXYGEN FLUORIDES, ALUER
CARBONY ... INORGANIC COMPOUNDS HALOGENS PIPERIDINES
... ORGANOMETALLIC COMPOUNDS, REPRINTS

IDENTIFIERS :   PE61102F WUAFOSR2303A2X

UNCLASSIFIED

SEARCH CONTROL NO DNE4B

AD A172 058   20 6   20 5

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

Cross beam saturated interference spectroscopy in
Flames

OCT 85   4P

PERSONAL AUTHORS Zizak G. ,Lanauze,J Winefordner,J D

CONTRACT NO   F49620 84 C 0002

PROJECT NO 2303

TASK NO A1

MONITOR   AFOSR
          TR 86 0 65

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE Pub in Applied Optics, v24 i20
p3319 3321, 15 Oct 85

ABSTRACT   The basic idea of saturated interference
spectroscopy is to reduce the intensity of the probe beam
by destructive interference with a reference beam This
is achieved using two physically separated laser beams
The interference null obtained in a Jamin interferometer
is distrubed when a pump beam saturates the absorption
along the path of the probe beam In this work we have
extended the saturated interference technique to the
hostile environment of a flame by separating and
recombining the two collinearly counter propagating
laser pulses produced by nitrogen pumped dye laser

DESCRIPTORS   SPECTROSCOPY, LASER APPLICATIONS,
ABSORPTION, DESTRUCTION, INTERFERENCE INTERFEROMETERS,
PROBES, SATURATION, DIFFUSION, SURFACES, LIGHT PULSES,
PROPAGATION, ENVIRONMENTS, LASER BEAMS, PUMPS, DYES,
INDUCED LUMINESCENCE, FLAMES, SODIUM, DYE LASERS,
ABSORPTION COEFFICIENTS, BARIUM POLARIZATION, EXCITATION
DECAY.

AD-A172-351   17 2   9 2

TEXAS UNIV AT AUSTIN DEPT OF ELECTRICAL AND COMPUTER
ENGINEERING

(U) An Analysis of a CSMA/CD (Carrier Sense Multiple
Access with Collision Detection) Collision Resolution
Scheme.

APR 86   11P

PERSONAL AUTHORS: Liu,Yih-Chiao ;Wise,Gary L. .

CONTRACT NO: AFOSR-81-0047; AFOSR-86-0026

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
          TR-86-0795

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the Annual Allerton
Conference on Communication, Control, and Computing (23rd)
Held at Monticello, ILL on 2-4 Oct 85, p533-542.

ABSTRACT: (U) This paper analyzes the performance
characteristics of a packet broadcasting random multiple
access computer communication network with a CSMA/CD
protocol. The analysis is based on the Enet II protocol,
which was designed to effectively resolve collisions in
such a network. Bounds on the performance of the network
are established. Keywords: retransmission; CSMA/Carrier
Sense Multiple Access); Nonparametric analysis. (Author)

DESCRIPTORS: (U) *COMPUTER COMMUNICATIONS,
*COMMUNICATIONS NETWORKS, COLLISIONS, DETECTION,
NONPARAMETRIC STATISTICS, PROTOCOLS

IDENTIFIERS: (U) CSMA(Carrier Sense Multiple Access),
*Computer networks, Packet communications, Ethernet
computer networks, Computer protocols, PE61102F,
WUAFOSR2304A5

AD-A172-351

TECHNION - ISRAEL INST OF TECH HAIFA

(U) Behaviour of Random Processes at Extrema.

85   25P

PERSONAL AUTHORS: Aronowich M ;Adler R J

CONTRACT NO: AFOSR 83-0068

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
          TR 86-0795

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub in Advances in Applied
Probability V17 p280-297 1985.

ABSTRACT: (U) Certain aspects of the sample path
behaviour of chi square processes are studied. In
particular problems related to the behaviour of these
processes at their local extrema. Emphasis is placed on
behaviour that is qualitatively different to that
observed for Gaussian processes, rather than on phenomena
common to both classes of processes, such as previously
studied global extremal type results. Keywords: Density
of Heights and Curvature at Extrema; Horizontal Window
Conditioning; Reprints

DESCRIPTORS: (U) *CHI SQUARE TEST, STATISTICAL PROCESSES,
REPRINTS, GAUSSIAN QUADRATURE

IDENTIFIERS: (U) Extremal problems, PE61102F,
WUAFOSR2304A5

AD-A172-256

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 350   CONTINUED

AD A172 350   6 16   6 1

GORDON RESEARCH CONFERENCES INC KINGSTON RI

IDENTIFIERS (U)   Phosphoinositides. PE61102F
WUAFOSR2312A1

(U) Report on the Gordon Research Conference on Molecular
and Cellular Aspects of Neural Plasticity (5th) Held
at Wolfeboro New Hampshire on 21 .6 Jul 85

DESCRIPTIVE NOTE   Final rept. 1-26 Jul 85

DEC 85   8P

PERSONAL AUTHORS   Dunn Adrian J

CONTRACT NO   AFOSR-85 0176

PROJECT NO   2 2

TASK NO.   A1

MONITOR   AFOSR
TR 86 0700

UNCLASSIFIED REPORT

ABSTRACT   (U)   The focus of the conference was on
mechanisms of neural plasticity The scope of the
conference was deliberately broad, so that a range of
neuroscientists could be exposed to ongoing work in areas
that they might not otherwise be aware of, but which
might have import for their own studies. Thus anatomists
may benefit from principles used in biochemical or
neurophysiological studies, and vice versa The sessions
were informal and concentrated on Factors Affecting the
Duration of the Critical Period in the Visual System;
Phosphoinositides as Second Messengers; formation of New
Functional Circuits; Formation of new neural connections;
Method of Assessing Changes of Neural Connectivity;
Regulation of Neurotransmitter and Hormone Receptors;
Modulators of Simple Neuronal Systems; Molecular Models
of Learning; Role of Biogenic Amines and Endorphins in
Neuroplasticity, and Molecular Aspects of Nerve Growth

DESCRIPTORS   (U)   MOLECULAR BIOLOGY, CYTOLOGY, NERVES,
CATECHOLAMINES, MODULATORS, GROWTH-GENERAL, NERVE CELLS,
NERVOUS SYSTEM, LEARNING, MODELS, MOLECULES, NERVOUS
SYSTEM, ELASTIC PROPERTIES, AMINES, VISION, EYE,
NEUROCHEMISTRY, TRANSMISSION, NEURAL NETS, MOTOR NEURONS,
CHEMICAL PROPERTIES, CENTRAL NERVOUS SYSTEM

AD-A172 350

AD-A172 308   7-4

AIR FORCE GEOPHYSICS LAB HANSCOM AFB MA

(U) Determination of Vibrational Energy Levels and
Parallel Band Intensities of (12)C (16)O2 by Direct
Numerical Diagonalization.

86   19P

PERSONAL AUTHORS: Wattson,Richard B. ;Rothman,Laurence S.

REPORT NO.   AFGL-TR-86-0187

PROJECT NO.   7670

TASK NO   16

MONITOR   AFOSR
           TR-86-0187

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Molecular
Spectroscopy, v119 p83-100 1986

ABSTRACT: (U)   The Direct Numerical Diagonalization (DND)
technique has been applied to the principal symmetric
species of carbon dioxide. A three dimensional
formulation of the DND method has been implemented as a
first step in using the method to calculate properties of
simple polyatomic molecules. Recent high resolution
observations of both line positions and intensities have
been incorporated in to the method to yield new values
for the potential function and the dipolar coefficients.
The results are compared with the potential functions
calculated by earlier DND efforts as well as the contact
transformation approach. The results are also discussed
in terms of the effects of truncation errors caused by
the use of finite matrices to represent the Hamiltonian
operator. The resulting eigenvectors have been used to
determine a dipole moment function from 21 observed band
intensity estimates for Carbon Dioxide (Carbon 12 and
Oxygen 16) parallel bands which are being used to update
the AFGL line parameter compilation. This list represents
the first published set of band intensity vales derived
from a consistent quantum mechanical model for a linear
polyatomic molecule. Keywords: Reprints; Absorption;
Infrared; Carbon dioxide; Intensities.

AD-A172 308

PAGE   178   EVN54B

UNCLASSIFIED   AD-A172 308   EVN54B

(U) Bis Di Isopropyl Phosphido (µ-(1,2)
Isopropyl Phosphinidene) Metal Carbonyl Complexes
from Reactions of Manganese and Cobalt Carbonyls with
Bis Di Isopropylphosphino Phosphine X Ray Crystal
Structures of (µ-(1,2) Ni2PMn2 CO)8H and PF (1,2(NPCO3
(CO)9

DESCRIPTIVE NOTE: Journal article.

84   4P

PERSONAL AUTHORS: King,R B ;Fu,W F ;Holt,E M .

CONTRACT NO   AFOSR 84-0050

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
           TR-86-0236

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of the Chemical Society.
Chemical Communications p1439-1440 1984

ABSTRACT: (U)   Reactions of (Pr superscript (i) 2N 2PH with
Mn2 CO)10 protochemical in tetrahydrofuran) and Co2(CO)8
hexane at ambient temperature give yellow (Pr
superscript (i) 2N 2PMn2 CO)8H and green-black Pr
superscript (i) 2NPCO3 CO)9 respectively, whose structures
have been determined by X ray crystallography. reaction
of (Pr superscript (i) 2N 2PMn2 CO)8H with HX (X=Cl and Br)
results in elimination of a P-N bond but retention of the Mn
H bond to give (Pr superscript (i) 2NPX)Mn2(CO)8H

DESCRIPTORS: (U) *CRYSTAL STRUCTURE, *ORGANOMETALLIC
COMPOUNDS, *CARBONYL COMPOUNDS, CLEAVAGE, COBALT
COMPOUNDS, FURANS, HEXANES, HYDROXYL RADICALS,
CRYSTALLOGRAPHY, TEMPERATURE, X RAYS, PHOTOCHEMICAL REACTIONS,
MANGANESE COMPOUNDS, PHOSPHINE.
PHOSPHORUS COMPOUNDS

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A172 259   20/10

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) Comparative Tests of Theoretical Procedures for
Studying Chemical Reactions.

85   7P

PERSONAL AUTHORS: Dewar,Michael J. ;Storch,Donn M. ;

CONTRACT NO.   F49620-83-C-0024. NSF-CHE82-17948

PROJECT NO.   2303

TASK NO.   B2

MONITOR: AFOSR
                TR-86-0772

UNCLASSIFIED REPORT

ABSTRACT: (U)   A simple procedure is described for
    estimating the effective errors in molecular energies
    calculated by ab initio methods with respect to use of
    the latter in studies of chemical reactions. The
    procedure is illustrated by application to the STO-3G. 3-
    21G. and 6-31G+ models. Parallel results from
    semiempirical models (MINDO/3. MNDO. AM1) are included
    for comparison. The STO-3G. 3-21G. and 6-31G+ basis sets
    cover a wide range. from a minimum basis set (STO-3G) to
    a split basis set with polarization functions (6-31G+).
    These have been extensively used and the results of
    calculations for quite a wide range of molecules are
    listed in a compilation by People et al. Using them. we
    determined values of and e sub p and e sub p prime for
    carbon. hydrogen. nitrogen. and oxygen for each of the
    basis sets indicated above. These are listed in Table II.
    in atomic units (hartrees). for conformity with published
    values for the calculated molecular energies. Conversion
    factors to other units are shown in a footnote to the
    table

DESCRIPTORS.   (U).   *QUANTUM THEORY. *MOLECULAR PROPERTIES.
    *CHEMICAL REACTIONS. CARBON. CONVERSION. ENERGY.
    MOLECULES. OXYGEN. RANGE(EXTREMES). CHEMICAL REACTIONS.
    HYDROGEN. NITROGEN. FUNCTIONS. POLARIZATION. HEAT OF

AD-A172 259

AD-A172 308   CONTINUED

DESCRIPTORS.   (U).   *CARBON DIOXIDE. *MOLECULAR ENERGY
LEVELS. *MOLECULAR VIBRATION. COEFFICIENTS. CONSISTENCY.
DIPOLE MOMENTS. DIPOLES. EIGENVECTORS. ERRORS.
FORMULATIONS. HAMILTONIAN FUNCTIONS. HIGH RESOLUTION.
LINEAR SYSTEMS. OBSERVATION. PARALLEL ORIENTATION.
POLYATOMIC MOLECULES. QUANTUM THEORY. REPRINTS. SYMMETRY.
THREE DIMENSIONAL. TRUNCATION. OPERATORS(MATHEMATICS).
RADIATION ABSORPTION. INFRARED RADIATION

IDENTIFIERS.   (U).   DND:Direct Numerical Diagonalization.
PE62101F WUAFGL76701603

AD-A172 308

UNIVERSITY OF ILLINOIS AT URBANA COORDINATED SCIENCE LAB.

Doping Effects and Compositional Grading in Al sub x
Ga sub 1-x As/GaAs Heterojunction Bipolar Transistors.

JUN 85   6P

PERSONAL AUTHORS: Chand Naresh ; Morkoc Hadis .

UNCLASSIFIED REPORT

ABSTRACT: (U)   First-order analytical calculations were
made for the energy-band diagrams for n-Al sub x Ga sub 1-x As/
pGaAs heterojunctions for x = 0.15, 0.3 and 0.5
employing different compositional gradings and doping
densities specifically for heterojunction-bipolar-
transistor (HBT) applications. In the calculations most
recently determined, conduction-band discontinuity delta
EC of 65 percent of the bandgap difference delta Eg
between the Al sub x Ga sub 1-x As and 0.5 respectively, were
used. The results show that the position of the
heterojunction spike barrier, and the depth and width of
the notch in the conduction-band edge for a
compositionally abrupt heterointerface depend on the
respective doping densities on the p and n sides of the
heterojunction. Also, for an abrupt heterointerface the
difference in barrier heights for electron and hole
injections varies between delta Eg and delta EV (the
valence band discontinuity), depending on the doping
densities and the applied bias, and is not necessarily
the generally accepted value of delta EV. Analytical
expressions and curves were obtained to estimate the
minimum compositional grading L for eliminating the spike.

DESCRIPTORS: (U)   *DOPING, *BIPOLAR TRANSISTORS, BARRIERS,
BIAS, COMPUTATIONS, DENSITY, DIAGRAMS, DISCONTINUITIES.

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UNCLASSIFIED   PAGE   180   EVN548

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DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A172 255   CONTINUED

ELECTRONS. ENERGY BANDS. GALLIUM ARSENIDES.
HETEROJUNCTIONS. MATHEMATICAL ANALYSIS. SIDES. SPIKES.
VALENCE BANDS. VALUE. ALUMINUM. GALLIUM ARSENIDES.
CONDUCTION BANDS

IDENTIFIERS: (U)   PE61102F. WUAFOSR2305:1

AD-A172 254   6/16   5/10

NEW YORK UNIV. N Y

(U) Visual Motion Perception and Visual Attentive
Processes.

DESCRIPTIVE NOTE: Final rept. 30 Sep 84-29 Sep 85.

JUN 86   7P

PERSONAL AUTHORS: Sperling,George ;

CONTRACT NO.   AFOSR-80-0279

PROJECT NO.   2313

TASK NO.   A5

MONITOR: AFOSR
TR-86-0559

UNCLASSIFIED REPORT

ABSTRACT: (U)   The main activities in the fifth year of
this grant have been carrying out the experimental
research set forth in the proposals (1980, 1984),
following up promising leads that developed in the course
of this work, and preparing manuscripts for publication.

DESCRIPTORS: (U)   *VISUAL PERCEPTION, *ATTENTION. MOTION.
PERFORMANCE(HUMAN). IMAGES. COMPRESSION. SPACE PERCEPTION.
MEMORY(PSYCHOLOGY). AUDITORY SIGNALS

IDENTIFIERS: (U)   Motion detection. Auditory memory.
Bandwidth compression. WUAFOSR2313A5. PE61102F

AD-A172 254

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AD A172 253

COLUMBIA UNIV NEW YORK DEPT OF MATHEMATICS

Nonlinear Partial Differential Equations and Related
Problems of Pade Approximations

DESCRIPTIVE NOTE   Final Rept 30 Jun 81 30 Sep 85

SEP 85

PERSONAL AUTHORS   Chudnovsky D V   Chudnovsky G V

CONTRACT NO   AFOSR 81 0190

PROJECT NO   2304

TASK NO   A4

MONITOR   AFOSR
           TR 84 0654

UNCLASSIFIED REPORT

ABSTRACT   (U)   The focus of the authors work is the
understanding and possibly explicit mathematical solution
of the physically realistic classical and quantum models
of field theories in dimensions one to four They aim at
the description of hidden symmetries and analytic
structures of the solutions of various physical systems
in dimensions one four described by systems of nonlinear
p d e in cases when a system is suspected of being
completely integrable or at the investigation of
obstructions to complete integrability We continued and
expanded our earlier studies of the structure of infinite-
dimensional Lie algebras generated by Baecklund
transformations and the geometric interpretation of the
structure of S matrices applied to the extension of the
Bethe Ansatz determining the solutions of completely
integrable quantum systems to three and four-dimensional
systems Very little is currently known in these cases
and there arise new multidimensional generalizations of
factorization equations of S matrices that have to be
solved A totally new area for mathematical studies has
been opened by recent progress in the physics of
superstrings where we hope to apply our methods of multi
particle and multi string interactions, and where the use
of methods from algebraic topology and theta functions
some of which were introduced by us in lower dimensional
cases earlier seems very promising

AD A172 253

DESCRIPTORS   (U)   *PARTIAL DIFFERENTIAL EQUATIONS.
*NONLINEAR DIFFERENTIAL EQUATIONS. ALGEBRAIC TOPOLOGY.
APPROXIMATION(MATHEMATICS). FOUR DIMENSIONAL. MATHEMATICS.
MODELS. PHYSICAL PROPERTIES. QUANTUM THEORY.
SOLUTIONS(GENERAL). STRUCTURES. THEORY. WORK. LIE GROUPS.
S MATRIX

IDENTIFIERS   (U)   X-Pade Approximants. Classical physics.
PE61102F, WUAFOSR2304A4

AD A172 253

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 252   6/1   6/16   AD-A172 252   CONTINUED

TEXAS A AND M UNIV COLLEGE STATION DEPT OF VETERINARY
PHYSIOLOGY AND PHARMACOLOGY

(U) Biochemical Regulation of the Response of the
Sympathetic Nervous System

DESCRIPTIVE NOTE   Final rept Jun 84 Feb 86

MAY 86   8P

PERSONAL AUTHORS   Vulliet,Philip R

CONTRACT NO   AFOSR 84-0122

MONITOR   AFOSR
           TR 86 0690

UNCLASSIFIED REPORT

NERVOUS SYSTEM. ACETYLCHOLINE, CATECHOLAMINES, DOSAGE,
ENZYMES, EPINEPHRINE, LIMITATIONS, LOW TEMPERATURE,
MOLECULAR PROPERTIES, PHOSPHORYLATION, PREPARATION,
PROTEINS, RATES, RATS, RESTRAINT, SECRETION, SYNTHESIS

ABSTRACT   (U)   This project has examined molecular
mechanisms regulating the reactivity of the adrenal
medulla and sympathetic nervous system. The isolated
perfused rat adrenal gland preparation was established in
this laboratory to evaluate the effects of physiological
and environmental manipulation on the responsivity of the
adrenal medulla. Treatments such as chronic
immobilization or cold stress, which result in prolonged
adrenal medullary discharge in vivo result in enhanced
adrenal medullary reactivity in vitro as evidenced by the
increased secretion of epinephrine from the perfused
adrenal gland. The specific biochemical processes
underlying this increased reactivity are being
investigated using tyrosine hydroxylase the rate
limiting enzyme in the synthesis of the catecholamine
neurotransmitters as a key marker protein. Tyrosine
hydroxylase is known to be phosphorylated by four
distinct protein kinases in up to four unique sites. The
activity of this protein is correlated with tissue levels
of catecholamines and its induction is correlated with
the enhancement of the bioreactivity of the perfused
adrenal gland. Factors that modulate tissue levels of
catecholamines and tyrosine hydroxylase are being
investigated to determine the mechanism by which they
modulate the amount of catecholamines released in
response to a fixed dose of acetylcholine.

(U) STRESS (U), ADRENAL GLANDS, ADRENAL MEDULLA
(U), NERVOUS RESPONSE BIOLOGY), BIOCHEMISTRY, SYMPATHETIC

AD-A172 252

ABSTRACT: (U) The techniques of laser double resonance
or near-infrared fluorescence detection in combination
with direct excitation of overtone vibrations provide
detailed data on the rates and pathways of collisional
energy transfer in hydrogen fluoride and deuterium
fluoride. These measurements yield the self-relaxation
rate constants for HF(v=1,2,3,4,5) and DF(v=1,2). In
addition, they determine the relative importance of the
vibration-vibration and vibration-translation, rotation
energy transfer pathways for v > or = 2 in both molecules.
Applying these techniques at higher temperatures gives
the self-relaxation rate constants between 300 and 700 K
for HF(v=1-5). Using different partners permits the
determination of the rate constants for collisional
relaxation of HF(v=3,4,5) by H2, D2, CH4, CD4, and CO2.

ABSTRACT: (U) This obtains sufficient condition for an
autonomous functional differential equation to generate a
strongly monotone semiflow on a suitable state space.
This allows the application to functional differential
equations of very powerful recent results on strongly
monotone semiflows due to Hirsch and Matano. In addition,
a very striking relationship is established between such
functional differential equations and corresponding
ordinary differential equations. An example, involving a
biochemical feedback loop is considered. Keywords:
stability steady states.

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 249   4 1   8 14   1 ` ?   AD-A172 249   CONTINUED

SRI INTERNATIONAL MENLO PARK CA

FIELDS, INTERPLANETARY SPACE TWILIGHT, ELECTRIC FIELDS,
E REGION, MAGN(TOSPHERE, INCOHERENT SCATTERING, REPRINTS

(U) Sondrestrom Radar Observations of the Effect of the
IMF by Component on Polar Convection

85   14P

IDENTIFIERS: (U) IMF(Interplanetary Magnetic Fields),
Auroral ovals, PE61102F, WUAFOSR2310A2

PERSONAL AUTHORS: DE LA Beaujardiere Odile Wickwar,V B
King J H

CONTRACT NO   F49620-83 K 0005, NSF ATM-1 21671

PROJECT NO   2310

TASK NO   A2

MONITOR   AFOSR
TR 86 0513

UNCLASSIFIED REPORT

ABSTRACT: (U)   Average patterns of convection derived
from Sondrestrom radar observations reveal that the
interplanetary magnetic field dawn-dusk component (IMF By)
strongly influences the nighttime polar convection. The
convection for one orientation of By is not the mirror
image of the other orientation. A positive By seems to
organize the velocities such that at all local times,
there are predominantly westward within the radar latitude
range. On a case by case basis, several oval boundaries
can be determined by coincident (FUB particle data and by
radar measured E region densities. Second occasion of
positive By convection flow is is eastward flow is is
observed in the polar cap between noon and midnight for
large negative By. Large southward velocities are
observed about three hours before midnight. These are the
only times when the predominant velocity component is
toward southward. When By is negative, in the midnight
and dawn sectors, the plasma velocities appear random
However, the average drifts are mostly southward. The
radar average patterns are compared with theoretical
predictions.

DESCRIPTORS: AURORAE BOUNDARIES, CONVECTION
DENSITY IMAGES LATITUDE MEASUREMENT NIGHT
ORIENTATION(DIRECTION) PARTICLES PLASMAS PHYSICS),
USE CASE, E REGION) PREDICTIONS, RADAR
RANGE(EXTREMES) THEORY TWILIGHT, VELOCITY, MAGNETIC

AD-A172 249

AD-A172 249

CINCINNATI UNIV OH DEPT OF CHEMISTRY

Ethylamine and Ammonia as Catalysts in the In Situ Precipitation of Silica in Silicone Networks

JAN 86   5P

PERSONAL AUTHORS   Ning, Y. P.   Mark, J. E.

PROJECT NO   2303

TASK NO   A3

MONITOR   AFOSR
TR-86-0734

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub in Polymer Engineering and Science. v26 n2 p167-170 Jan 86.

ABSTRACT: (U)   Both ethylamine and ammonia in aqueous solutions catalyze the hydrolysis of tetraethylorthosilicate to precipitate silica filler within polydimethylsiloxane elastomers. The rate of filler precipitation can vary in a complex manner, possibly due to loss of colloidal silica and, in the case of the ethylamine solutions, deswelling of the networks. Increase in catalyst concentration increases the precipitation rate, and increase in amount of filler precipitated dramatically increases the modulus and ultimate strength of the networks, thus demonstrating the desired reinforcing effects

DESCRIPTORS: (U)   CATALYSTS, SILICON DIOXIDE, ELASTOMERS, CHEMICAL PRECIPITATION, AMMONIA, COLLOIDS, FILLERS, HYDROLYSIS, LOSSES, METHYL RADICALS, NETWORKS, POLYMERS, PRECIPITATES, PRECIPITATION RATES, REINFORCING MATERIALS, SILICONES, SILOXANES, SOLUTIONS(MIXTURES), STRENGTH(GENERAL), WATER, AMINES, ETHYL RADICALS, SILICATES, MODULUS OF ELASTICITY

IDENTIFIERS: (U)   PE61102F, WUAFOSR2303A3

PAGE   186   EVN54B

PERSONAL AUTHORS   Grossberg Stephen

CONTRACT NO   F49620-86-C-0066

PROJECT NO   2313

TASK NO   A5

MONITOR   AFOSR
TR-86-0684

UNCLASSIFIED REPORT

ABSTRACT   CONTENTS: Perceptual Dynamics of Form, Color, Lightness, and Depth Perception, Experiments on Surface Perception, Shape-from-Shading, Neural Dynamics of Adaptive, Sensory-Motor Control, Ballistic Eye Movements, Form and Organizing Recognition, Vision, Cognition, and Cognition, Neural Dynamics of Conditioning, Reinforcement, and Attention, and Biological Rhythms and Mental Disorders, Psychology, Psychobiology, Color vision

DESCRIPTORS   SPACE PERCEPTION, VISUAL PERCEPTION, BALLISTICS, BIOLOGICAL RHYTHMS, COGNITION, COLOR VISION, DYNAMICS, EYE MOVEMENTS, MENTAL DISORDERS, MULTICHANNEL, NERVOUS SYSTEM, NEUROBIOLOGY, NONLINEAR SYSTEMS, PERCEPTION, RECOGNITION, SELF ORGANIZING, SYSTEMS, VISION, SHAPE, ADAPTATION, PATTERN RECOGNITION

IDENTIFIERS   PE61102F
WUAFOSR2313A5

AD-A172 241

SEARCH CONTROL NO. DYN54B

AD A172 240   CONTINUED

CARBON MONOXIDE   NITROGEN, BOLTZMANN EQUATION, CHANNELS,
DISTRIBUTION, DUAL CHANNEL, EIGENVALUES, HIGH TEMPERATURE,
QUANTUM THEORY, TEMPERATURE, THERMAL RADIATION, MOLECULAR
ROTATION, MOLECULAR VIBRATION

IDENTIFIERS   U   PE61102F, WUAFOSR2303B1

DESCRIPTORS ... HOT PRESSING, HYDROSTATIC PRESSURE, SUPERALLOYS, NICKEL ALLOYS, POWDER METALLURGY, BAR METAL, PRESSURE, BOUNDARIES, CARBIDES, CREEP, DEFORMATION, DISTRIBUTION, MECHANICAL PROPERTIES, PARTICLES, PIVOTS, POWDERS, PRECIPITATION, PRESSURE, PROCESSING TEMPERATURE, PLASTIC FLOW

IDENTIFIERS   U   ,UAFOSR2206A1 PE61102F

PERSONAL AUTHORS

CONTRACT N

PROJECT NO

TASK NO

MONITOR

UNCLASSIFIED REPORT

ABSTRACT
... hot isostatic pressing HIP to near net
... most effective method of superalloy
... powder as HIP superalloys have
... mechanical properties which can be
... prior article powder boundaries
... this problem is about altering
... comprising HIP densification to
... powder consists of
...

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVNF4B

AD A172 208   4/1

JOINT INST FOR LAB ASTROPHYSICS BOULDER CO

(U) Auroral Implications of Recent Measurements on O(1S) and O(1D) Formation in the Reaction of N+ with O2.

85   5P

PERSONAL AUTHORS   Langford,Andrew O. ;Bierbaum,Veronica M. ;Leone,Stephen R.

CONTRACT NO   F49620 83 C-0013

PROJECT NO.   2303

TASK NO   B1

MONITOR   AFOSR
TR-86-0743

SUPPLEMENTARY NOTE   Pub. in Planetary and Space Science v33 010 P1225 1223 1985

ABSTRACT   (U) Recent flowing afterglow measurements have shown that the reaction of N+ with O2 produces 70 + or 30% of the oxygen atom product as O(1D) and <0.1 as O(1S). These results indicate that this reaction does not contribute to the auroral green line emission 5577 A but can account for about 10% of the observed red line (6300 A auroral emission (reprints).

DESCRIPTORS   (U) *AURORAE, *MISSION SPECTRA,
*AFTERGLOWS, GREEN COLOR, LINE SPECTRA, REPRINTS, OXYGEN
RED COLOR, NITROGEN

IDENTIFIERS   (U) Ion molecule interactions, PE61102F
WUAFOSR2303B1

AD A172 208

DTIC REPORT BIBLIOGRAPHY

AD A172 202   7/3

GEORGIA UNIV. ATHENS DEPT OF CHEMISTRY

(U) Development of organophosphorus

44   4P

PERSONAL AUTHORS   King,P. B. ;Sydnor,Norman D.

CONTRACT NO   AFOSR 83-0050

PROJECT NO.   2303

TASK NO   B3

MONITOR   AFOSR
TR-86-0745

SUPPLEMENTARY NOTE   Pub. in Jnl of the Chemical Society,
Chemical Communications P955 956 1985

ABSTRACT   (U) Reduction of 1,2-NPPCl2 to cyclohexyl

DESCRIPTORS   (U) *AMINES, *PHOS. *ORGANIC RADICALS
*SYNTHESIS, CHEMISTRY, CHLORIDES, PHOSPHORUS, SECONDARY
REACTIONS, CHEMISTRY, CYCLIC COMPOUNDS, ORGANOMETALLIC
COMPOUNDS, CARBONYL COMPOUNDS, PYRIDINES, CHLORINE

AD A172 202

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) A MNDO Study of Tin Radical Cations.

85   7P

PERSONAL AUTHORS   Dewar, Michael J ; Grady Gilbert L ;
Kuhn, Daniel R

CONTRACT NO   F49620-83-C-0024

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
TR-86-0791

UNCLASSIFIED REPORT

ABSTRACT   (U)   Radical cations derived from stannane and
its alkyltrimethy derivatives (Me3SnR; R = Me, Et, i-Pr,
t-Bu) have been studied using MNDO. The calculated
structures agree with experiment. Fragmentations of the
radical cations have also been studied

DESCRIPTORS   (U)   *CATIONS, *TIN COMPOUNDS, *QUANTUM
CHEMISTRY, CHEMICAL RADICALS, TIN, ALKYL RADICALS, METHYL
RADICALS, COMPUTATIONS, REPRINTS

IDENTIFIERS   (U)   MNDO(Modified Neglect of Differential
Overlap), PE611102F, WUAFOSR2303B2

AD-A172 199

DESCRIPTIVE NOTE   26 Feb 85

FFB 85

PERSONAL AUTHORS   Kaufman, Larry

CONTRACT NO   F49620-83-C-0078

PROJECT NO   2303

TASK NO   A2

MONITOR   AFOSR
TR-86-0..

UNCLASSIFIED REPORT

ABSTRACT   (U)   Computer Coupled Phase Diagrams and
Thermochemical Data have been used to calculate the GeO2-
MgO, GeO2-HfO2, GeO2-TiO2, GeO2-Al2O3, GeO2-CaO, GeO2-
SiO2, TiO2-MgO, HfO2-SiO2, HfO2-MgO, HfO2-CaO, Al2O3-HfO2,
HfO2-Y2O3, HfO2-TiO2, Ge2O3-Al2O3, ZrO2-HfO2, ZrO2-SiO2,
ZrO2-CaO, Y2O3-MgO and Y2O3-CaO binary systems as well as
isothermal sections in ten MgO-TiO2-SiO2, MgO-SiO2-GeO2,
GeO2-MgO-SiO2, HfO2-CaO-MgO, HfO2-SiO2-ZrO2 and HfO2-CaO-
Y2O3 at temperatures between 700K and 3000K

DESCRIPTORS   (U)   *COMPUTER APPLICATIONS, *CERAMIC
MATERIALS, PHASE DIAGRAMS, COMPUTERS,
COUPLING, INTERACTION, HIGH TEMPERATURE, ISOTHERMS,
STRUCTURES, THERMOCHEMISTRY, COMPUTATIONS, BINARY,
COMPOUNDS, HIGH TEMPERATURE

IDENTIFIERS   (U)   PE611102F, WUAFOSR2306A2

AD-A172 2..

AD A172 194   20 12   AD A172 187   7 3

SRI INTERNATION'L MENLO PARK CA   GEORGIA INST OF TECH ATLANTA DEPT OF CHEMISTRY

U Semiconductor Engineering for High Speed Devices   U Dialkylaminodichlorophosphines

DESCRIPTIVE NOTE   Quarterly rept no 2 1 Oct 31 Dec 85.   DESCRIPTIVE NOTE   Journal article.

DEC 85   8P   85   6P

PERSONAL AUTHORS   Shor A , Frensley W C , Gron A B   PERSONAL AUTHORS   King R B , Sadanani,Narayan D

CONTRACT NO   F19628 85 C 0103 ARPA 4864 0003   PROJECT NO   2303

PROJECT NO   63   TASK NO   B7

TASK NO   25   MONITOR   AFOSR
                                                        TR 86 0 67
MONITOR   RADC
           TR 86 0068

ABSTRACT   (U) ... ... to devise the
... ...
... ...
... ...
... ...
... ...
... ...
... ...

UNCLASSIFIED REPORT   UNCLASSIFIED REPORT

ABSTRACT   (U) Reactions of secondary amines, R2NH, with
phosphorus trichloride are used to prepare a variety of
dialkylaminodichlorophosphines, R2NPCl2 R = Me Et iPr,
C   (cyclohexyl) and R2N   piperidino 2,3
dimethylpiperidino, and 2,2,6,6 tetramethylpiperidino
which have been characterized by their phosphorus 31 NMR
and mass spectra Dialkylaminodibromophosphines is also
described Preparation of C 2NP 2,6 C cyclohexyl with
various groups C 2NPH2 as an table are extensively used and
which can be converted into the relatively stable metal
carbonyl complexes C 2NPH2M   ... M Cr and W   and
C 2NPH2F   86 4 the 2,2,6,6 tetramethylpiperidino
derivative CMe2 CH2 3CMe2NPH2 is also isolable

DESCRIPTORS: () *ATMOSPHERIC MOTION, *TURBULENCE,
*RADAR IMAGES, (), *WIND SHEAR, AIRCRAFT, BUOYANCY, ENERGY
LEVELS, HYPOTHESES, INTERNAL WAVES, MODELS, REPRINTS,
SCALE, SPECTRA, THEORY, TWO DIMENSIONAL, WAVES, WIND
WIND VELOCITY

IDENTIFIERS () WHAFOSR 2310A1

DEC 85

PERSONAL AUTHORS: Gage K S , Nastrom G D

CONTRACT NO F49620 82 C 0029

PROJECT NO 2310

TASK NO A1

MONITOR AFOSR
TR 86 0732

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in Radio Science , 21 n6 p1339-
1347 Nov Dec 85

ABSTRACT   () We consider the observations of the
spectrum of atmospheric motions over the range of periods
from a few minutes to many hours that have been made with
ST MST radars in the past 5 years. This range of periods
includes the periods associated with buoyancy waves and
the scale of atmospheric motions often referred to by
meteorologists as the mesoscale. We consider the spectra
of both horizontal and vertical velocities and examine
their interpretation in terms of buoyancy wave theory and
turbulence theory. To help in interpreting these spectra
we present some recently determined aircraft wavenumber
spectra. It is found that radar and aircraft horizontal
wind spectra are in reasonable accord with expectations
from quasi two dimensional turbulence theory. The
vertical velocity spectra are believed to be due to waves.
Comparison of the energy levels and shapes of the
horizontal and vertical velocity spectra are not
consistent with existing models of internal wave spectra
However, it is possible that these inconsistencies arise
from Doppler shifting effects that are not taken into
account in existing internal wave models. Nevertheless
we stress that all the observations we have examined
support the hypothesis that quasi two dimensional
turbulence coexists with a nearly universal spectrum of

AD-A172 155

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OPER REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN548

AD-A172 153   AD-A172 153   CONTINUED

GEORGIA UNIV ATHENS DEPT OF CHEMISTRY

LITHIUM ALUMINUM ALKYL RADICALS LIGANDS. REPRINTS

(U) Dialkylamino phosphines and Their Metal Carbonyl   IDENTIFIERS: (U) WUAFOSR2303B2. PE611C2F
Complexes

DESCRIPTIVE NOTE: Journal article

65   5P

PERSONAL AUTHORS: King P. B., Sadanani ...

CONTRACT NO.   AFOSR-84-0056 AFOSR-83...

PROJECT NO.   2303

TASK NO.   B2

MONITOR   AFOSR
            TR 86 0723

UNCLASSIFIED REPORT

REPORT CLASSIFICATION   Pub in Inorganic Chemistry V24 P20

ABSTRACT: Reaction of dilithium dialkylaminobis(...)
... diphosphide R2NPC12M with an appreciably large
... metal group ...

... pyridine, ...
... proton, and
... M2n
... carbonyl
... 5 M
... flammable solids
... free R2NPH2
... dicyclophosphazine
... R2NPH2 but this product
... the metal
... W can be
... flammable solids, by
... complexing R2NPC12M CO)

... METAL CARBONYLS
... COORDINATION CHEMISTRY

AD-A172 153

PERSONAL AUTHORS: Wang, L.; Langmyhr, A.; Winefordner, J. D.

CONTRACT NO: F49620-83-C-0022

PROJECT NO: 2303

TASK NO: A1

MONITOR: AFOSR
TR 86 0064

UNCLASSIFIED REPORT

ABSTRACT: The combination of an excimer (XeCl)
pumped pulsed dye laser with frequency doubled output as
an excitation source and the inductively coupled argon
plasma (ICP) as an atom cell reservoir was used in the
study of the atomic fluorescence of Ag Au Hf Ir Mo
Nb Pd Pt Rh Ru and Zr. The detection limits were
found to be in the range of 1.8-53 ng/mL ppb with a
linear dynamic range LDR of over four orders of
magnitude except for Au and Hf. These represent the
first published results for laser excited atomic
fluorescence spectroscopy in the ICP cell for the
elements studied except for Mo and Zr and the LODs
found were superior to those obtained by flame atomic
absorption spectroscopy FAAS except for Ag Au and Mo
and similar to those obtained by emission ICP.

DESCRIPTORS: ATOMIC SPECTROSCOPY LASER INDUCED
FLUORESCENCE ATOMS IONS RESERVOIRS
COUPLING INTERACTION PLASMAS PHYSICS DYNAMIC RANGE
ABSORPTION SPECTRA ATOMIC SPECTROSCOPY DYE LASERS
ARGON DETECTION LIMITATIONS EXCITATION SOURCES
FREQUENCY MULTIPLIERS PRECIOUS METALS COMPARISON
EXCIMERS LASER PUMPING GOLD HAFNIUM IRIDIUM

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AD A172 162

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EV454B

AD A172 149   7/3   7/4

GEORGIA UNIV ATHENS DEPT OF CHEMISTRY

(U) Metal Complexes of Fluorophosphines. Part XIV
Structures of Five Zerovalent Metal Complexes of
Methylaminobis(Difluorophosphine).

85   12P

PERSONAL AUTHORS: King R B , Chang M , Newton M G

CONTRACT NO   AFOSR 84 0050

PROJECT NO   2302

TASK NO   B2

MONITOR   AFOSR
                TR 86 0788

UNCLASSIFIED REPORT

ABSTRACT   (U)   Details are presented of single crystal x
ray diffraction determinations of the structures of the
five zerovalent metal complexes, Cr-PF2N CH3 2 PF2
2NCH3 Fe PF2 2NCH3 4 and CH3N PF2 2 2CO2L2   1 CO
CH3NHPF2 and CH3 2NPF2   The chromium atom in
CrPF2N CH3 24 PF2 2NCH3 has a distorted octahedral
coordination with four monodentate CH2 2NPF2 ligands and
one bidentate CH3N PF2 2 ligand   the small bite of the
latter ligand distorts one   the idealized 90 degree
angles of the CrP5 octahedra   to 6? degrees The iron
atom in Fe PF2 2NCH34 has a   started trigonal
bipyramidal coordination with three monodentate CH3 N PF2
2 ligands and one bidentate   dN PF2 2 ligand the
bidentate CH3N PF2 2 ligand in Fe PF2 2NCH34 is
coordinated to an axial and an equatorial positions of the
FeP5 trigonal bipyramid and because of its small bite
squeezes the relevant ax fe teq angle from the idea
value of 90 degrees down to 69 degrees The structures of
the binuclear cobalt complexes CH3N PF2 233Co2l2 L
CH2 2NPF2 and CH3NHPF2 may be regarded as consisting of
two Co2Cl3 trigonal bipyramids linked through a cobalt
cobalt bond

DESCRIPTORS   U   FLUOROPHOSPHINES, METAL COMPLEXES

AD A172 149

AD A172 150   7 3   20 10

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) MXDO Study of 2 4 6 ? ?   ?   ? adamantane
                   55   5?

PERSONAL AUTHORS Dewar Michael J , Grady Richard C

CONTRACT NO   F19620 82 C 0024

PROJECT NO   ????

TASK NO   ?

MONITOR   ?? ?
              TR ?? 0788

UNCLASSIFIED REPORT

ABSTRACT   ?   ?   ? ?   ? ? ? for 2 4 6
? ? ? ? ? ? ? ? ? ?   ? ? the
? ? ? ? ? ? ? ? ? ?   ? ? predictions
? ? ? ? ? ? ? ? ? ? ? ? ? ? radical
? ? ? ? ? ? ? ? ? ? ? ? ?

DESCRIPTORS   ? ? ? ? ? ?   ? HETEROCYCLIC COMPOUNDS
? ? ? ? ? ? ? ? ? ? ? ? ? ? ? BRIDGED CATIONS
? ? ? ? ? ? ? ? ? ? ?

ABSTRACT: (U)   This paper presents a method for
retrieving the frequencies of sinusoidal or narrowband
signals in additive noise using a cascade implementation
of a least mean square in additive noise using a cascade
implementation of a least mean square Adaptive Notch
Filter (ANF). The approach taken here has the advantage
that the computational burden is low due to a simplified
gradient computation. We present an analysis of the
convergence properties and the steady state error
variance of the ANF. Simulation results are presented to
illustrate the operation of the ANF and verify the
accuracy of the analysis. (REPRINTS)

DESCRIPTORS: (U) *ADAPTIVE FILTERS, COMPUTATIONS,
CONVERGENCE, ERRORS, GRADIENTS, LEAST SQUARES METHOD,
MEAN, SIMPLIFICATION, SIMULATION, STEADY STATE,
VARIATIONS, NOTCH SENSITIVITY, SINE WAVES, REPRINTS,
NARROWBAND

IDENTIFIERS: (U) Adaptive notch filters, PE61102F,
WUAFOSR2304A6

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DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO EVN54B

AD-A172 141   20 6

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Convergent Scheme for Light Scattering from an
Arbitrary Deep Metallic Grating.

FEB 86   9p

PERSONAL AUTHORS: Agassi,Dan George,Thomas F.

CONTRACT NO: F49620 86-C-0009

PROJECT NO: 2303

TASK NO: B3

MONITOR AFOSR
         TR 86 0706

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in Physical Review B
                       15 Feb 86

ABSTRACT   (U)   The justification of continuing the
Rayleigh expansion to the grating's surface (the Rayleigh
hypothesis) and its convergence properties are considered
for a grating for which the Rayleigh hypothesis is
... sample of which is the
... grating. ... Based on an identification of
the origin of the limited stability of the Rayleigh
expansion ... introduced, dubbed as
... Rayleigh expansion. This new scheme is
... its excellent convergence properties as
... demonstrated for the sinusoidal grating. The
... N of the matrix which must be inverted for
... arbitrary depth ... periodicity d is found to
... a ... g d Rayleigh ... light scattering. Users.
... ... grating Rayleigh hypothesis. Convergent
... sinusoidal grating reprints.

DESCRIPTORS: (U)   GRATINGS SPECTRA (RAYLEIGH
SCATTERING CONVERGENCE HYPOTHESIS LIGHT SCATTERING,
... METALS REPRINTS STABILITY SURFACES
... BROAD ANGLE LASER COMPONENTS

IDENTIFIERS   (U)   Sinusoidal gratings PE61102F
WUAFOSR2303B3

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PAGE 191

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PRINCETON UNIV NJ DEPT OF ELECTRICAL ENGINEERING AND
COMPUTER SCIENCE

(U) On the Convergence of a Variable Step Size Adaptive
Filter.

JUN 86   8p

PERSONAL AUTHORS: Kuo C Liu B

CONTRACT NO: AFOSR 81 0186

PROJECT NO: 2304

TASK NO: A5

MONITOR AFOSR
         TR 86 0733

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in IEEE
...

ABSTRACT
...

Record 1

PERSONAL AUTHORS: Keller, Joseph B

CONTRACT NO: AFOSR 85-0007

PROJECT NO: 2304

TASK NO: A4

MONITOR: AFOSR TR-86-0769

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Theoretical and Applied Mechanics, p31-41 1985

ABSTRACT: (U) Much recent progress in mechanics is related to the use of computers in the solution of problems, in the control of experiments, and in the analysis of data. These tools have made certain kinds of calculations and measurements easier. But they have also revealed the widespread occurrence of chaotic and stochastic behavior of mechanical systems, and have shown that there are certain regularities in this behavior. The understanding of the chaotic behavior and its regularities, and of how to analyze and control it, are unsolved problems. Many theoretical attacks have been made on these problems, but they have only touched the surface

DESCRIPTORS: (U) *STOCHASTIC PROCESSES, *MECHANICS, PROBLEM SOLVING, MECHANICAL COMPONENTS, ENTROPY, COMPUTER APPLICATIONS, APPLIED MECHANICS, THEORY, REPRINTS

IDENTIFIERS: (U) Chaos, PE61102F, WUAFOSR2304A4

AD A172 138

Record 2

PERSONAL AUTHORS: Basu, Asit P; Ebrahimi, Nader

CONTRACT NO: AFOSR 84-0...

PROJECT NO: 2304

TASK NO: A5

MONITOR: AFOSR TR-86-0...

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Reliability and Quality Control, p... 1986

ABSTRACT: (U) For failures which occur in accordance with a nonhomogeneous Poisson process the mean time between failures is constant. In the case of a nonhomogeneous Poisson process this is no longer true and it is not clear what concept should take the place of the mean time between failures as a criterion for assessing system reliability. Two possibilities are explored in this report. Keywords: Stochastic processes. Author

DESCRIPTORS: (U) *STOCHASTIC PROCESSES, ASYMPT... SERIES, MEAN, RELIABILITY, REPAIR, REPRINTS, TIME, FAILURE, TIME INTERVALS

IDENTIFIERS: (U) Poisson processes, PE61102F, WUAFOSR2304A5

AD A172 39

AD A172 136   20 10   20 6

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

A New Procedure for Calculating Molecular
Polarizabilities: Applications Using MNDO

NOV 84   5P

PERSONAL AUTHORS: Dewar, Michael J.; Stewart, James J.

CONTRACT NO: F49620-83-C-0024   AFOSR-82-0024

REPORT NO: 2290

USP NO: 32

MONITOR:

SUPPLEMENTARY NOTE:

ABSTRACT:

U Evidence for Soliton-Phonon Interaction in trans-
Polyacetylene: Temperature and Frequency Dependence of
Electron Spin Lattice Relaxation Data

85   11P

PERSONAL AUTHORS: Robinson, B. H. ;Schurr, J. M.   Putnam, A.
L. ;Thomann, H.   ;Kim, H.

CONTRACT NO: F49620-85-C-0096; AFOSR-85-0095

PROJECT NO: 2303

TASK NO: A3

MONITOR AFOSR
        TR-86-0800

UNCLASSIFIED REPORT

ABSTRACT   (U)   The temperature, frequency, and isotope
dependence of the electron spin-lattice relaxation rate R
sub 1 for the paramagnetic defects in pristine trans-
polyacetylene is analyzed in terms of a model in which
the electron electron dipolar interaction between spins
is modulated by one-dimensional diffusion induced by
phonon scattering of the mobile spins. At room
temperature, this model predicts R sub 1 to the 1 2 power
temperature dependence for R sub 1 at low temperatures
depending upon assumptions about the phonon spectrum
estimates on the temperature dependence of R sub 1 range
from T squared to T to the 5 2 power. The frequency
dependence of R sub 1 is theoretically predicted to be
described by a angular frequency to the 1 2 power
dependence which is found to accurately fit the
experimental data obtained over the frequency range 35
MHz to 40 GHz. The interpretation of electron spin
lattice relaxation data is consistent with ENDOR
electron phase memory relaxation data, EPR line width
data, and nuclear relaxation data. We consider the
implications of this analysis for various soliton
descriptions of the paramagnetic defect.

AD-A172 126

RTLF REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVN54B

AD A172 126   CONTINUED   AD-A172 125   7-4

                                  STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

                                  (U) Cooperative Emission by Two Different Atoms into
                                       Surface Plasmons.

                                  DEC 85   19P

PERSONAL AUTHORS: Liu,W. C. ;George,Thomas F ;

                                  CONTRACT NO.   AFOSR-82-0046

                                  PROJECT NO   2303

                                  TASK NO   B3

                                  MONITOR   AFOSR
                                             TR-86-0776

                                          UNCLASSIFIED REPORT

ABSTRACT   (U)   The interaction between surface plasmons
and two atoms with different electronic transition
frequencies near a metal or doped semiconductor surface
is considered. The atom-atom and atom-surface interaction
are assumed to be smaller than the corresponding atomic
resonance wavelength, the th evolution of the entire system
rate of such an atomic pair   to surface plasmon modes is
calculated in a fully quantum mechanic 1 manner. Explicit
results are given for various initial states of the
distance separation as the inc new differences both on
gamma where gamma is the inc   that width of the atomic
resonance   in a the emiss   behaves as if there are two
identical atoms. On the other hand when Delta gamma
one that has are found in the emission rate as a function
of   in all cases as a manifestation of beating the
effect   are especially pronounced when the atoms
that this is initially in a coherent state For the atoms of
the particular state corresponding to complete photon
trapping in the case of two identical atoms a particu
two different atoms exhibits oscillating emission int
the superradiant region not an eventual decay to zero
Keywords   Two interacting atoms Metal surface Reprint
Doped semiconductor surface Superradiance and photon
trapping Cooperative emission   Surface plasmon modes

AD A172 126   CONTINUED

DESCRIPTORS   (U)   ;POLYMERS ;ACETYLENE ;ELECTRONIC
STATES ;RELAXATION TIME ;CRYSTAL LATTICES ;SPIN STATES
REPRINTS ;ANGULAR MOTION ;DIPOLES ;ELECTRONS
INTERACTIONS ;ISOTOPES ;DIFFUSION ;ONE DIMENSIONAL
DEFECTS;MATERIALS ;PARAMAGNETISM ;ESTIMATES ;PHONONS
SPECTRA ;MEMORY DEVICES ;FREQUENCY ;LOW TEMPERATURE
SCATTERING ;ROOM TEMPERATURE ;TEMPERATURE

IDENTIFIERS   (U)   Solitons ;Electro
;Interactions ;WUAFOSR2303A3   PE61110

AD A172 124   ? 4

TORONTO UNIV (ONTARIO) DEPT OF CHEMISTRY

(U) Trajectory Study of Nonequilibrium Effects in Diatom Dissociation Reactions.

SEP 85   4P

PERSONAL AUTHORS: Burns,George ;Cohen,L. K.

CONTRACT NO: AFOSR-84-0127

PROJECT NO: 2303

TASK NO: B1

MONITOR: AFOSR TR-86-0771

UNCLASSIFIED REPORT

ABSTRACT (U) Five ensembles of 3 D classical trajectories, totalling over 100000 trajectories, were used to study the dissociation of Br in Ar in the linear regime, i.e. with recombination neglected. It was found that for a given temperature and potential energy function dissociation occurs at a precisely determinable unique steady state. Consequently, the steady state nonequilibrium energy distribution functions and rate constants are also unique for a given trajectory ensemble; they differ quantitatively from equilibrium distribution functions and the corresponding equilibrium rate coefficients. The findings obtained substantially tighten up the conceptual framework of the (single uniform ensemble) method and justify its further use as a tool to determine new observables in chemical reaction kinetics.

DESCRIPTORS (U) *REACTION KINETICS, *DISSOCIATION, *BROMINE, CHEMICAL REACTIONS, COEFFICIENTS, DISTRIBUTION FUNCTIONS, EQUILIBRIUM(GENERAL), NONEQUILIBRIUM FLOW, POTENTIAL ENERGY, REPRINTS, STEADY STATE, TRAJECTORIES, THERMAL PROPERTIES, THREE DIMENSIONAL

IDENTIFIERS (U) WUAFOSR2303B1, PE61102F

AD A172 124

AD A172 125   UNCLASSIFIED

DESCRIPTORS (U) *TRAPPING(CHARGED PARTICLES), *PLASMONS, *PHOTOELECTRIC EMISSION, *SURFACE CHEMISTRY, ATOMIC SPECTRA, ATOMS, DIATOMIC MOLECULES, ELECTRON TRANSITIONS, EMISSION, INTERACTIONS, METALS, OSCILLATION, PHOTONS, RADIANCE, RATES, REPRINTS, RESONANCE, SEPARATION, SPECTRAL LINES, TIME DEPENDENCE, QUANTUM THEORY, DOPING, SEMICONDUCTORS

IDENTIFIERS (U) Superradiance, WUAFOSR2303B3631303, PE61102F

AD A172 125

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO EVN54B

AD-A172 123   7/4   8/10

AD-A172 123   CONTINUED

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

CHLORIDES, COLUMN CHROMATOGRAPHY, DETECTION, DETECTORS,
DETERMINATION, GASES, HIGH TEMPERATURE, INORGANIC
COMPOUNDS, PYRROLIDINES, REPRINTS, SEA WATER,
SPECTROMETRY, TEMPERATURE, THERMOELECTRICITY, THIOUREA,
TRACE ELEMENTS, PHYSICOCHEMICAL PROPERTIES

(U) Determination of Copper in Seawater by High
Temperature Gas Chromatography with an Atomic
Absorption Spectrometric Detector

IDENTIFIERS   (U) WUA10SR2303A1 PE61102F

85   7p

PERSONAL AUTHORS   Ohta Kiyohisa Smith Robinson
Winefordner James D

CONTRACT NO   F49620 80 C 0005

PROJECT NO   2303

TASK NO   A1

MONITOR   AFOSR
TR 86 0761

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in Microchemical Jnl v32 p50 54
1985

ABSTRACT   (U) The large amount of chlorides in seawater
give rise to severe chemical as well as physical
interferences related to the complex physicochemical
phenomena for the determination of copper in
spectrochemical atomic absorption analyses. There are
great efforts have been devoted to minimize the
interference rate such as preparative acid
addition of thiourea and extract the copper complex
of ammonium pyrrolidine dithio sulfate
developed a high temperature gas volume
temperatures more than 1500 K C analysis of
trace elements and found the com ation of
several elements which were fec ganic compounds
such as nitrite we describe a direct to determine
copper directly in seawater by a combination of high
temperature gas chromatography liquid and atomic
absorption for detection In this sh the performance of
the high temperature gas chromat aphic column is
assessed by using Atomic fluorescence

AD A172 123

AD A172 123

AD-A172 121

CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF CHEMISTRY

(U) Ether Cleavage Following Insertion of Carbon Monoxide
into the Tantalum Silicon Bond of (Eta 5 C5Me5)
Ta(SiMe3)Cl3.

AUG 85   3P

PERSONAL AUTHORS: Arnold John ;Tilley,T D

CONTRACT NO   AFOSR-85-C228

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
               TR-86-0701

UNCLASSIFIED REPORT

ABSTRACT: (U) The tantalum silyl Cp*Ta(SiMe3)Cl3 (3, Cp*
= eta 5 - C5Me5), prepared from Cp*TaCl4 and Al(SiMe3)3
OEt2, reacts with carbon monoxide (10-100 psi) to yield
products which are determined by the react on solvent. In
ethers with Beta-CH3 groups (diethyl ether and 2-
methyltetrahydrofuran), insertion of CO leads to cleavage
of an ether carbon-oxygen bond to produce the cyclic
complexes Cp*Cl3TaOCH(SiMe3)C(O)OR (4, R = Et and 6, R =
(CH2)3CH=CH2). Compounds 4 and 6 have been characterized
by elemental analysis, IR and NMR (1H and 13C)
spectroscopy labelling studies and derivative chemistry.
These reactions are believed to involve addition of the
ethers to an intermediate ketone complex derived from CO
insertion. In tetrahydrofuran, the reaction of 3 with CO
leads to reductive elimination of Me3Si-Cl with formation
of Cp*TaCl2(CO)2(THF).

DESCRIPTORS   (U) *ETHERS, *CLEAVAGE, *CARBON MONOXIDE,
*TANTALUM, *SILICON, *CHEMICAL BONDS, ADDITION CHEMICAL
DERIVATIVES, ETHYL RADICALS, FURANS, HYDROXYL RADICALS,
SOLVENTS, SPECTROSCOPY, YIELD, CHEMICAL REACTIONS,
ADDITION REACTIONS, REDUCTION CHEMISTRY, ELIMINATION
REACTIONS, CHLORINE

AD-A172 121

UNCLASSIFIED

AD-A172 122

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF
MATERIALS SCIENCE AND ENGINEERING

(U) Transformation Range Viscosity of Fluorozirconate
Glasses

AUG 84   3P

PERSONAL AUTHORS: Shelby,James E ;Pantano,Carlo G
;Tesar,Aleta A

CONTRACT NO   AFOSR-82-0013

PROJECT NO   2303

TASK NO   A3

MONITOR   AFOSR
               TR-86-0598

UNCLASSIFIED REPORT

ABSTRACT: (U) Heavy Metal fluoride glasses have been the
subject of intense study because of their potential
application as infrared optical fibers. Although many
glass forming systems based on fluorides have been
investigated, the fluorozirconate glasses appear to be
the most widely studied to date. Transformation range
viscosity was measured for multicomponent fluorozirconate
glasses in the system 0.56ZrF4-0.34-x)BaF20.06LaF30
0.4AlF3xRF, where R = Li, Na, K or Cs. The results
indicate that the viscosity range from 10,000,000 to the
twelfth power Pas with an activation energy of the order
of 650 to 850 kJ. In general, the effects of alkali
fluoride additions on the viscosity of fluorozirconate
glasses are comparable to those in silicate systems

DESCRIPTORS   (U) *GLASS, *VISCOSITY, *FLUORINE COMPOUNDS,
*ZIRCONATES, FLUORIDES, SILICATES, FIBER OPTICS, INFRARED
RADIATION, TRANSFORMATIONS, ACTIVATION ENERGY, ALKALI
METAL COMPOUNDS, BARIUM, ALUMINUM, REPRINTS

IDENTIFIERS   (U) WUAFOSR2303A3, PE61102F

AD-A172 122

DTIC REPORT BIBLIOGRAPHY

AD-A172 109   7/4   20/10

AD-A172 108   20/10   7/3

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) The MNDO Potential Energy Surface and Tunnelling
Dynamics of the Cyclobutane Radical Cation

(U) AM1 A New General Purpose Quantum Mechanical
Molecular Model.

85   9P

85   10P

PERSONAL AUTHORS: Dewar,Michael J ; Merz,Kenneth M .   Jr

PERSONAL AUTHORS: Dewar,Michael J. ;Zoebisch,Eve G. ;
Healy,Eamonn F .;Stewart,James J .

CONTRACT NO   F49620-83-C-0024

CONTRACT NO   F49620-82-C-0024

PROJECT NO   2303

PROJECT NO.   2303

TASK NO   B2

TASK NO.   B2

MONITOR   AFOSR
           TR 86-0702

MONITOR: AFOSR
           TR 86-0784

UNCLASSIFIED REPORT

UNCLASSIFIED REPORT

ABSTRACT   (U) The potential energy surface of the
cyclobutane radical cation is examined in detail using
the MNDO method. The calculations contradict a recent ESR
study, where the lowest energy structure was assigned as
a puckered rhombus (C sub 2v). Our calculations suggest
that the trapezoid structure (C sub 2v) is the lowest
energy species. Tunnelling calculations also predict that
the cyclobutane radical cation undergoes rapid
interconversion via tunnelling between equivalent
trapesoids at temperatures below 100 k. These results are
then used to explain the observance of a time-line ESR
spectra for the cyclobutane radical cation

ABSTRACT   (U) A new parametric quantum mechanical
molecular model. AM1 (Austin Model 1), based on the NDDO
approximation is described. In it the major weaknesses
of MNDO, in particular failure to reproduce hydrogen
bonds, have been overcome without any increase in
computing time. Results for 167 molecules are reported.
parameters are currently available for C, H, O, and N. As
the tests reported here indicate, AM1 seems to represent
a very real improvement over MNDO, with no increase in
the computing time needed. The specific failings in MNDO
have been at least moderated while the average error for
molecules of other kinds has also been reduced. The main
gains are the ability of AM1 to reproduce hydrogen bonds
and the promise of better estimates of activation
energies for reactions

IDENTIFIERS   (U) PE61102F WUAFOSR2303B2

IDENTIFIERS   (U) NDDO Molecular Orbitals, Austin 1
Molecular Model. PE61102F. WUAFOSR2303B2

AD A172 109

AD A172 108

AD-A172 103   6, 3

TEXAS UNIV MEDICAL SCHOOL AT HOUSTON

(U) Neural and Molecular Mechanisms Underlying Information Storage in Aplysia. Implications for Learning and Memory.

NOV 85   7P

PERSONAL AUTHORS: Byrne,John H

CONTRACT NO: AFOSR-84-0213

PROJECT NO: 2312

TASK NO: A1

MONITOR: AFOSR TR-86-0782

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: (U) Pub. in Trends in NeuroSciences. v8 n11 p478-482 Nov 85.

ABSTRACT: (U) The marine Molusk Aplysia is one of several experimental preparations that neuroscientists are using to help understand the mechanisms underlying learning and memory. Simple behavioral modifications such as sensitization and classical conditioning can be related to changes in the ability of previously formed synaptic connections to release neurotransmitter substance. The modifications of transmitter release in turn are regulated by the intracellular second messengers Ca2+i and cAMP. The second messenger systems may act separately in the case of non-associative learning (sensitization) but their specific interactions may underly forms of associative learning such as classical conditioning. Keywords. Artificial intelligence.

DESCRIPTORS: (U) *APLYSIA, ARTIFICIAL INTELLIGENCE, DATA STORAGE SYSTEMS, INTERACTIONS, LEARNING, MODIFICATION, MOLECULAR PROPERTIES, NERVE TRANSMISSION, NERVOUS SYSTEM, TRANSMITTERS, NEUROBIOLOGY, MEMORY(PSYCHOLOGY), REPRINTS

IDENTIFIERS: (U) F 61102F, WUAFOSR2312A1

AD-A172 103

AD-A172 104

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Coherence Effects in Pump-Probe Measurements with Collinear Copropagating Beams

84   8P

PERSONAL AUTHORS: Palfrey,S L ;Heinz,T F ;Eisenthal,K B

CONTRACT NO: AFOSR-84-0013

PROJECT NO: 2303

TASK NO: B2

MONITOR: AFOSR TR-86-0716

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: (U) Pub in Ultrafast Phenomena. v4 p216-219 1984

ABSTRACT: (U) When pump-probe measurements are performed using pulses originating from the same laser, it is necessary to consider the coherent interaction of the two pulses in determining material relaxation rates on the time scale of the pulse duration. In the usual geometry in which the beams cross at an angle the effects of the coherent coupling on the observed signal are well known. In this case the coherent contribution to the signal may be viewed as a scattering of the pump radiation into the probe direction by a spatial grating induced when the pump and probe are simultaneously present in the sample. We consider here the influence of coherence effects on pump-probe measurements with collinear, copropagating beams of orthogonal polarization. Despite the fact that the grating vanishes in this geometry we find, in contradiction with earlier predictions that the coherent interaction still remains.

DESCRIPTORS: (U) *LASERS, *PROBES, *PUMPS, COHERENCE, COUPLING(INTERACTION), GRATINGS(SPECTRA), INTERACTIONS, MATERIALS, PULSE RATE, PULSES, RADIATION, RATES, RELAXATION, SCALE, SPATIAL DISTRIBUTION, TIME

IDENTIFIERS: (U) PE61102F, WUAFOSR2303B2

AD-A172 104

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A172 102   20/5   7/5

STATE UNIV OF NEW YORK AT BUFFALO AMHERST

(U) Laser Induced Collision Processes Polarization
    Effects and Ionization

    85   25P

PERSONAL AUTHORS: Shue Fai-Shu ;Devries Paul L :George
    Thomas F

CONTRACT NO. AFOSR-82-0046

PROJECT NO. 2303

TASK NO. B?

MONITOR: AFOSR
    TR-86-0704

SUPPLEMENTARY NOTE: Pub in Spectral Line Shapes, v3 p369
392 1985

ABSTRACT: (U) Polarization aspects of photon emission
... laser induced collision processes are
... optically along with a review of recent
... the emission of through spectral features
... ionization ... probability in ... ... ionization
... ... the processes ... also
... ... reduced
... ... processes
... ... and ... effects
...

AD-A172 101   7/4   20/10

CHICAGO UNIV IL JAMES FRANCK INST

(U) Control of Selectivity of Chemical Reaction Via
    Control of Wave Packet Evolution.

    NOV 85   8P

PERSONAL AUTHORS: Tannor,David J. ;Rice,Stuart A.

CONTRACT NO. F49620-85-C-0002

PROJECT NO. 2303

TASK NO. B1

MONITOR: AFOSR
    TR-86-0752

SUPPLEMENTARY NOTE: Pub in Jnl of Chemical Physics, v83
n10 p5013-5018, 15 Nov 85

ABSTRACT: (U) Is it possible by control of the nature
of the excitation process to control the selectivity of
a chemical reaction? Previous attempts to answer this
question have focused attention on the free evolution of
an excited molecule treating the excitation and the
evolution processes as separate. In these analyses and the
various experiments carried out to date leads to the
conclusion that because of rapid intramolecular
vibrational redistribution any induced selectivity of
reaction is not in general possible. In this paper
the authors show that de facto photon of a prepared
vibrational state distribution ... ... of atoms c
reaction ... be achieved by use of coherent two photon
processes. The problem of ... the optimum waveform
of a coherent pulse sequence that will produce the
formation of a desired vibrational wave packet is solved
for motion in the excited state surface and analyses for
two different cases.

AD-A172 101

AD A172 101   UNCLASSIFIED

SPECTROSCOPY COHERENT SCATTERING TRANSITIONS MOLECULAR STATES FLUORESCENCE CONTROL REPRINTS

IDENTIFIERS: U Dephasing PE61102F WUAFOSR2301B1

AD A172 095   9 2   17 2   17 2

TEXAS UNIV AT AUSTIN DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

U & Performance Analysis of a CSMA/CD Protocol

DESCRIPTIVE NOTE: Rept. for 1 Oct 80-30 Sep 85.

APR 86   5P

PERSONAL AUTHORS: Liu,Yih Chiao ,Wise,Gary L

CONTRACT NO AFOSR-81-0047

PROJECT NO 2304

TASK NO A5

MONITOR: AFOSR
TR-86-0793

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the Midwest Symposium on Circuits and Systems (28th) Held at Louisville, KY on 19-20 Aug 85.

ABSTRACT: U An analysis of some performance characteristics of a CSMA CD computer network protocol is presented. The analysis is based on the Enet II protocol which is designed to effectively resolve collisions in the network. In this paper we derive an expression for the average time to resolve a collision involving a given number of stations. We also give an expression for the average time until a packet involved in a collision is successfully transmitted

DESCRIPTORS: (U) *NETWORKS, *MESSAGE PROCESSING, *COMPUTER COMMUNICATIONS, PERFORMANCE TESTS, COMPUTER PROGRAMMING, DATA LINKS, CONTROL

IDENTIFIERS: (U) *Local area networks, *Computer networks, Computer protocols, ENET 2 Computer networks, CSMA CD Carrier Sense Multiple Access Collision Detection, PE61102F WUAFOSR2304A5

AD A172 095

AD-A172 094   12 1

AD-A172 094   CONTINUED

ILLINOIS UNIV AT CHICAGO CIRCLE STATISTICAL LAB

FUNCTIONS. PARALLEL ORIENTATION. PARTS. POLICIES. RANDOM VARIABLES. REPLACEMENT

(U) Closure of the NBUE (New Better Than Used in Expectation) and DMRL (Decreasing Mean Residual Life) Classes under Formation of Parallel Systems

IDENTIFIERS: (U) NBUE (New Better Than Used in Expectation). DMRL (Decreasing Mean Residual Life). PE61102F. WUAFOSR2304A5

DESCRIPTIVE NOTE Technical rept

DEC 85   9p

PERSONAL AUTHORS: Abouammoh A ... El M...

CONTRACT NO AFOSR-85-0320

PROJECT NO ...

TASK NO ...

MONITOR ...

UNCLASSIFIED REPORT

AD A172 095

NORTH CAROLINA UNIV AT CHAPEL HILL DEPT OF ANATOMY

(U) Biosonar Signal Perception and Analysis

DESCRIPTIVE NOTE   Final Rept   15 Dec 84 31 Dec 85

FEB 86   45

PERSONAL AUTHORS   Henson, O W   Jr

CONTRACT NO   AFOSR 85 0063

PROJECT NO   2917

TASK NO   A4

MONITOR   AFOSR
TR 86 0599

UNCLASSIFIED REPORT

ABSTRACT   (U)   This project has pursued behavioral
physiological and anatomical correlates of the biosonar
system of bats. We have used a simulated flight system to
record signal emissions and to analyze the response
properties of the ear and brain centers in animals
actively engaged in the imaging of specific targets. Much
new information has been obtained, especially with
respect to the potential importance of interference
patterns (beats) in biosonar signal detection and
analysis. Computer reconstruction techniques have been
used to study FFT displays and various anatomical
structures. Keywords. Acoustic signal perception, and
Bioacoustics

DESCRIPTORS   (U)   ANIMALS BIOACOUSTICS ACOUSTIC
SIGNALS. ANATOMY BRAIN EAR EMISSION FLIGHT SIMULATION
IMAGES INTERFERENCE PATTERNS PERCEPTION RESPONSE
SIGNALS STRUCTURES TARGETS

IDENTIFIERS   (U)   PE61102F WUAFOSR2917 A4

AD A172 095

AD A172 092

SRI INTERNATIONAL MENLO PARK CA

(U) Semiconductor Engineering for High Speed Devices

DESCRIPTIVE NOTE   Quarterly status rept no 1 1 Jun-15
Sep 85

SEP 85   5P

PERSONAL AUTHORS   Sher, A   Krishnamurthy, S   Chen, A   B

CONTRACT NO   F49620-85 C 0103   ARPA Order-5396

PROJECT NO   0053

TASK NO   96

MONITOR   AFOSR
TR 86 0797

UNCLASSIFIED REPORT

ABSTRACT   (U)   This rpt contains a summary of significant
accomplishments and progress during the reporting period
programs to calculate pure crystal and alloy band
structures have been completed and now include all
important components, e g long-range interactions, spin
orbit interactions, and molecular CPA. The parameters
that properly reproduce the band structures of light III
V compounds--GaP, InP, AlAs, GaAs, InAs, AlSb, GaSb, and
InSb--have been selected and their band structures
calculated We are now prepared to run the band
structures of the 14 three component pseudo binary
alloys of these materials. These calculations were
undertaken to test our procedures on a comparatively
simple, well characterized alloys system The results
agree with experiment and give satisfactory explanation
of several features that were previously thought to be
anomalous It is clear that the general trends of the
data and theory agree

DESCRIPTORS   (U)   SEMICONDUCTORS BAND THEORY OF SOLIDS
SILICON ALLOYS GERMANIUM ALLOYS BINARY ALLOYS
CRYSTALS ENGINEERING INTERACTIONS PATTERNS PURITY
MOLECULAR ORBITALS SPIN STATES GALLIUM ARSENIDES
GALLIUM PHOSPHIDES GALLIUM ANTIMONIDES INDIUM
ANTIMONIDES INDIUM PHOSPHIDES ALUMINUM ARSENIDES
ELECTRONIC SWITCHING HIGH RATE

AD A172 092

SEARCH CONTROL NO. EVN54R

REPORT BIBLIOGRAPHY

AD-A172 030   4 2   5 1

NATIONAL ACADEMY OF SCIENCES NATIONAL RESEARCH COUNC...
WASHINGTON DC

U Partial Support of Board on Atmospheric Sciences and
   Climate

DESCRIPTIVE NOTE   Final rept. 1 Dec 84-30 Nov 85

APR 86   4p

PERSONAL AUTHORS   Perry John S

CONTRACT N   AFOSR-84-0062

PROJECT NO   2310

TASK NO   A1

MONITOR   AFOSR
          TR-86-0308

UNCLASSIFIED REPORT

ABSTRACT   (U) The scientific and technical activities of
the Board were reviewed in broad perspective to provide
basic and applied research dealing with the atmosphere
...

AD-A172 030   CONTINUED

IDENTIFIERS
...

PENNSYLVANIA STATE UNIV. UNIVERSITY PARK DEPT OF
ELECTRICAL ENGINEERING

U Studies of Optical Wave Front Conjugation and Imaging
   Properties of Nematic Liquid Crystal Films

DESCRIPTIVE NOTE   Annual rept. 15 Sep 84-14 Sep 85

JUN 86   49P

PERSONAL AUTHORS   Khoo,Iam Choon .

CONTRACT NO   AFOSR 84-0375

PROJECT NO   2305

TASK NO   B4

MONITOR   AFOSR
           TR 86-0696

UNCLASSIFIED REPORT

ABSTRACT   (U)   Optical nonlinearities of liquid crystals
owing to laser induced molecular reorientation or laser
induced thermal index change were studied in the context
of optical wave mixings and real time imagings The basic
mechanisms and the dynamics of the nonlinearities were
studied in details in theories and in experiments using
lasers of various time scales and temporal
characteristics Quantitative documentation of nanosecond
laser induced thermal grating was performed for the first
time and further established the optical imaging and
switching capabilities of nematic liquid crystal film
The conversion of infra-red images to visible images via
real time optical wave mixing process was also
demonstrated The capability of optical four wave mixing
to generate amplified reflection and self oscillation in
nematic liquid crystal film was also demonstrated for the
first time Such a process will be useful for image
processing as well as laser oscillator adaptive optics
applications In this period new optical intensity
switching effects using the transverse optical
nonlinearity were also experimentally demonstrated that
will find applications in optical switching and power
self limiting devices

DESCRIPTORS   U   GRATINGS SPECTRA   NONLINEAR SYSTEMS

MANAGEMENT   METEOROLOGY   ATMOSPHERES   ATMOSPHERIC
CHEMISTRY   CLIMATOLOGY   ECONOMICS   GLOBAL   PHYSICAL
PROPERTIES   POLITICAL SCIENCES   SOLAR SYSTEM   WEATHER
MODIFICATION   SOLAR ACTIVITY CORRELATION TECHNIQUES
ECOLOGY

IDENTIFIERS   World climate program GARP Global
Atmospheric Research Project   PE61102F   WUAFOSR2310G1

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVN54B

AD A172 039   CONTINUED

AD A172 088   20,11   11/4

TECHNION - ISRAEL INST OF TECH   HAIFA   MATERIAL MECHANICS
LAB

(U) Thermomechanical Effects in Inelastic Materials and
Structures.

DESCRIPTIVE NOTE.   Annual scientific rept. 1 Jun 84-31 May
85

JUN 85   11P

PERSONAL AUTHORS: Bodner So'.. R .

CONTRACT NO.   AFOSR-84-0042

PROJECT NO   2307

TASK N°   B1

MONITOR   AFOSR
TR-86 0695

UNCLASSIFIED REPORT

ABSTRACT   (U)   The following topics were studied:
generalization of a set of constitutive equations to
include thermal dependence of viscoplastic flow and
thermal recovery of hardening, determination of the
effective thermo-elastic-viscoplastic properties of metal
matrix composites, including the influence of residual
thermal stresses, and the generalization of the
constitutive equations to the case of large deformations.
Publications based on the research program are listed.

DOCUMENTS   DYNAMICS, FILMS, IMAGE PROCESSING, IMAGES,
INFRARED IMAGES, LASERS, LIMITATIONS, LIQUID CRYSTALS,
MIXING, OPTICAL IMAGES, OPTICAL PROPERTIES, OPTICAL
SWITCHING, OSCILLATION, POWER, REAL TIME, SCALE,
SWITCHING, THERMAL PROPERTIES, TIME, TRANSVERSE, VISIBLE
SPECTRA, WAVES

IDENTIFIERS   U   PE61102F, WUAFOSR2307B4

DESCRIPTORS   U   THERMOMECHANICS, VISCOPLASTIC
PROPERTIES, THERMOELASTICITY, METAL MATRIX COMPOSITES,
EQUATIONS, COMPOSITE MATERIALS, THERMAL STRESSES, PLASTIC
DEFORMATION, ABSTRACTS

IDENTIFIERS   U   PE61102F, WUAFOSR2307B4

AD A172 088

SEARCH CONTROL NO. EVN54B

AD-A172 079   7/4

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Studies of Liquid Surfaces by Second Harmonic Generation.

DESCRIPTIVE NOTE: Rept. for 1984-1985.

86   4P

PERSONAL AUTHORS: Hicks,J.M. ;Kemnitz,K. ;Eisenthal,K.B. ;Heinz,T.F.

CONTRACT NO. AFOSR-84-0013

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-86-0755

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Jnl. of Physical Chemistry. v90 n4 p560 562 1986.

ABSTRACT: (U) Information on the orientation and relative composition of solute molecules at the surface of a liquid solution has been obtained by the technique of second harmonic generation. In an aqueous phenol solution, the phenol molecules at the vapor/solution interface are found to be oriented with their long axes tilted 50 degs. from the surface normal. The orientation is found to be insensitive to the concentration of the phenol solution. A comparison with surface concentration information obtained from surface tension data is made.

DESCRIPTORS: (U) *SURFACE CHEMISTRY, *SURFACE ACTIVE SUBSTANCES, *SOLUTES, *PHENOLS, HARMONIC GENERATORS, DYE LASERS, POLARIZATION, MOLECULES, CHEMICAL COMPOSITION, ORIENTATION(DIRECTION), INTERFACIAL TENSION, VAPORS, SOLUTIONS(MIXTURES).

IDENTIFIERS: (U) WUAFOSR2303B2, PE61102F

AD-A172 079   PAGE 214   EVN54B

AD-A172 083

CITY COLL NEW YORK

(U) Identifying Coefficients in the Spectral Representation for First Passage Times.

DESCRIPTIVE NOTE: technical rept

MAY 86   13P

PERSONAL AUTHORS: Brown,Mark ;Shao Yi Shi

REPORT NO. CUNY-MBR4 02 TR 84-02 AFOSR

CONTRACT NO. AFOSR-84-0015

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR TR-86-0779

UNCLASSIFIED REPORT

ABSTRACT: (U) The spectral approach to first passage time distributions for Markov processes requires knowledge of the eigenvalues and eigenvectors of the infinitesimal generator matrix. We demonstrate that in many cases knowledge of the eigenvalues alone is sufficient to compute the first passage time distribution.

DESCRIPTORS: (U) *MARKOV PROCESSES, EIGENVALUES, COEFFICIENTS, MATRICES(MATHEMATICS), SPECTRUM ANALYSIS.

IDENTIFIERS: (U) First passage time, Birth and death processes, Spectral representation, PE61102F, WUAFOSR2304A5.

AD-A172 083

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN548

AD-A172 077   7.4   7/3

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Studies of the Chemical Intermediate Diphenylcarbene:
Intersystem Crossing, Solvent Effects on Dynamics,
Spin State Selective Chemistry. Photochemistry of the
Excited Triplet State.

DESCRIPTIVE NOTE: Journal article.

84   24P

PERSONAL AUTHORS: Sitzmann E V ,Eisenthal K B

CONTRACT NO   AFOSR-84-0013

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
TR 86-0749

ABSTRACT   (U) Because of their importance as reactive
chemical intermediates, the novelty of their reactions
and their unusual spectroscopy, carbenes have been and
will continue to be the focus of intense study. The study
of intramolecular relaxation processes of carbenes by
time resolved experiments provides important insight into
the properties inherent to the carbene system, employing
picosecond spectroscopy the time evolution of the rapidly
interconverting singlet and triplet carbene states can be
mapped out, thus allowing the determination of the spin
equilibration rate between singlet and triplet states,
which is of key importance in determining the nature and
distribution of chemical products and providing an
estimate of the energy separation between these states.

DESCRIPTORS   (U) *CARBENES, PHENYL RADICALS,
*SPECTROSCOPY, *REACTION KINETICS, CHEMICAL REACTIONS,
DYNAMICS, MOLECULAR PROPERTIES, RELAXATION, MOLECULAR
STATES, SPIN STATES, EQUILIBRIUM, GENERAL, ENERGY,
SEPARATION, TRANSPORT PROPERTIES, SOLVENTS, PHOTOCHEMICAL,
REACTIONS, EXCITATION, QUENCHING, REPRINTS

IDENTIFIERS   (U) Triplet States, Singlet States,

AD A172 077

AD-A172 078   7.3   7.2

GEORGIA UNIV ATHENS DEPT OF CHEMISTRY

(U) Synthesis of Heterobimetallic Complexes from Carbonyl
Complexes of Bis-diisopropylamino Phosphine

DESCRIPTIVE NOTE: Journal article.

85   4P

PERSONAL AUTHORS: King R B ,Fu W K ,Holt E M

CONTRACT NO   AFOSR-84-0050

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
TR 85-0758

ABSTRACT   (U) The preliminary observations described in
this communication suggest that the selective cleavage
diisopropylamino groups from metal carbonyl complex of
or2N 2PH can lead ultimately to a rich variety of
oligomeric heterometallic derivatives. These
derivatives contain potentially reactive phosphorus-
nitrogen bonds in contrast to the previously known
diaryl aminophosphorametallics derivatives such as
(CH3)2PH(CO)5 and C5H5(CO)5 and Mo(CO)2Cp
P NR2 and (CO)4W PPh2 D ... and (CO)2FW Me ...
PPh2 2Cp ...

DESCRIPTORS   (U) *SYNTHESIS,CHEMISTRY, *METAL COMPLEXES,
*ORGANOMETALLIC COMPOUNDS, HETEROCYCLIC COMPOUNDS, METAL
METAL BONDS, BIMETALS, PHOSPHINE, PROPYL RADICALS, AMINES,
*IRON, CHROMIUM, WOLFRBENUM, PHOTOLYSIS, CLEAVAGE,
REPRINTS

IDENTIFIERS   (U) *AFOSP2303B2, PE61102F

AD A172 078

AD-A172 076   7/4   7.5

COLUMBIA UNIV   NEW YORK   DEPT OF CHEMISTRY

(U) Intermolecular Effects on Intersystem Crossing Studied
on the Picosecond Time Scale: The Solvent Polarity
Effect on the Rate of Singlet to Triplet Intersystem
Crossing of Diphenylcarbene.

84   3P

PERSONAL AUTHORS: Sitzmann, E. V. ;Langan, J. ;Eisenthal, K.
B. ;

CONTRACT NO.   AFOSR-84-0013

PROJECT NO.   2303

TASK NO.   B2

MONITOR: AFOSR
TR-86-0748

UNCLASSIFIED REPORT

ABSTRACT: (U)   Intersystem crossing plays a critical role
in defining the intramolecular dynamics of
diphenylcarbene (DPC) and thereby directly affects its
spin state depdent chemistry. In the studies reported
here the diphenylcarbene is generated by photoexcitation
of diphenyldiazomethane in the ultraviolet, which yields
DPC upon loss of nitrogen from the excited singlet state
of the diazo compound. Once formed, DPC will undergo
energy relaxation via intersystem crossing to produce the
ground triplet.

DESCRIPTORS: (U)   *CARBENES, *PHENYL RADICALS, *MOLECULE
MOLECULE INTERACTIONS, *PHOTOCHEMICAL REACTIONS,
TRANSPORT PROPERTIES, DYNAMICS, SPIN STATES, EXCITATION,
RELAXATION, GROUND STATE, SOLVENTS, POLARITY, REPRINTS

IDENTIFIERS   (U)   Crossing, Singlet States, Triplet
States, WUAFOSR2303B2, PE61102F

AD-A172 076

AD-A172 076   CONTINUED

Crossing   WUAFOSR2303B2   PE61102F

AD-A172 077

AD-A172 071   20 3

NAVAL ORDNANCE TEST STATION   CHINA LAKE CALIF   MICHELSON
LABS

(U) Exoatmospheric Applications of Obscurants and Smokes

DESCRIPTIVE NOTE   Final rept

SEP 85   99P

PERSONAL AUTHORS   Wilhelm,H E

CONTRACT NO   AFOSR 85 0011

PROJECT NO   ? 06

TASK NO   C4

MONITOR   AFOSR
            TR 86 0634

UNCLASSIFIED REPORT

ABSTRACT   (U)   Contents: Dissociation Association
Equilibrium of Magnetic Particle Chains in Homogeneous
Magnetic Fields; Diffusion and Coagulation of Magnetic
Dipole Particles in Inhomogeneous Magnetic Fields;
Statistical Distribution of Collective Electric Fields in
Charged Particle Gases; Covariant Electromagnetic Theory
for Inertial Frames with Substratum Flow

DESCRIPTORS   (U)   AEROSOLS   MAGN... ...   FIELDS   SMOKE
ABSORBATION PARTICLES MAGNETIC ...   . TIC FIELDS
CHARGED PARTICLES

IDENTIFIERS   (U)   Preprints Spec... ...
...-ABOR-ORO-C 85511025   4... ...

AD-A172 071

AD-A172 070   6/1   6/15

ISTITUTO DI RICERCHE FARMACOLOGICHE MARIO NEGRI   MILAN
(ITALY)

(U) Anticholinesterase Effects on Number and Function of
Brain Muscarinic Receptors and Central Cholinergic
Activity. Drug Intervention

DESCRIPTIVE NOTE   Final rept   31 Dec 84-30 Nov 85

APR 86   65P

PERSONAL AUTHORS   Consolo Silvana

CONTRACT NO   AFOSR 85-0025

PROJECT NO   2312

TASK NO   A5

MONITOR   AFOSR
           TR-86-0624

ABSTRACT   (U)   The effects of acute and chronic
treatments with the organophosphorous cholinesterase
inhibitor DDVP dichlorvos   (O 1 dimethyl 0-(2 2
dichlorovinyl) phospate combined with drug treatments
were studied on rat brain regional cholinergic parameters
acetylcholine content choline content
acetylcholinesterase choline acetyltransferase sodium
dependent high affinity chol... uptake muscarinic
receptor subtypes   Results... by that the increase in
brain regional acetylcholine induced by DDVP can... to some
extent be dissociated from its cholinesterase inhibition
of the drug DDVP appears to stimulate a positive
feedback mechanism to shut down cholinergic nerve
terminals and this is held to be at least partly
responsible for the increase in acetylcholine This
results in an intraneural accumulations of the
cholinergic neurotransmitter Drugs that possibly
interfere with the feedback may cause a shift in the
proportion of intraneural acetylcholine in favor of the
former in cholinesterase poisoned rats In rats treat...
chronically with DDVP ACHE activity was reduced by more
than 50% in the striatum hippocampus and cortex At the
same time ACh content in these regions was not altered
Marked tolerance to the ACh accumulating action of DDVP

AD-A172 070

AD-A172 070   CONTINUED

and cross tolerance to the increase produced by
physostigmine were induced in the striatum but not in the
hippocampus or cortex.

DESCRIPTORS: (U) *CHOLINESTERASE INHIBITORS,
*ACETYLCHOLINE, *BRAIN, CHEMORECEPTORS, MUSCARINE,
NEUROCHEMISTRY, CHOLINES, ACETYLCHOLINESTERASE,
HIPPOCAMPUS, ORGANIC PHOSPHORUS COMPOUNDS, NEUROCHEMICAL
TRANSMISSION, CEREBRAL CORTEX, CHOLINERGIC NERVES, RATS,
ITALY

IDENTIFIERS: (U) Anticholinesterase effects, Striatum,
Dichlorvos, DDVP, PE61102F, WUAFOSR2312A5

AD-A172 069   12/1   13/13

PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF
MATHEMATICS

(U) Stabilization and Control Problems in Structural
     Dynamics.

DESCRIPTIVE NOTE: Annual rept 1 Sep 85-31 Mar 86.

MAY 86   6P

PERSONAL AUTHORS: Chen,Goong :

CONTRACT NO   AFOSR-85-0253

PROJECT NO.   2304

TASK NO. A1

MONITOR: AFOSR
           TR-86-0605

UNCLASSIFIED REPORT

ABSTRACT: (U)   The completed research includes
significant accomplishments on such problems as the
stabilization and control of serially connected beams,
point actuators and sensors for second order systems, the
boundary element numerical method for two dimensional
linear quadratic elliptic problems, quasi-variational
inequalities, analysis and design of dissipative joints
in structures, a boundary element method based on Cauchy
integrals for some linear quadratic elliptic problems,
and the stabilization of nonlinear strings.

DESCRIPTORS: (U) *PARTIAL DIFFERENTIAL EQUATIONS,
STABILIZATION SYSTEMS, CONTROL SYSTEMS, OPTIMIZATION,
ACTUATORS, STRUCTURAL ANALYSIS, DYNAMICS

IDENTIFIERS: (U)   Structural dynamics, PE61102F,
WUAFOSR2304A1

AD-A172 069

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 060   7/4

AD-A172 060   CONTINUED

CHICAGO UNIV IL JAMES FRANCK INST

WUAFOSR2303B1

(U) A Scattering Resonance Description of Very Low Energy
     Collision Induced Vibrational Relaxation.

SEP 85   14P

PERSONAL AUTHORS   Gray, Stephen K. ;Rice Stuart A. ;

CONTRACT NO   F49620-85-C-0003

PROJECT NO.   2303

TASK NO   B1

MONITOR   AFOSR
           TR 86-0753

UNCLASSIFIED REPORT

ABSTRACT   (U)   A study is reported of very low energy
collision induced vibrational relaxation using an
approximate resonant state formalism which relates the
inelastic cross section to the properties of metastable
states. A study of models loosely based on the He + I2(B3
pi sub 0 sub u) system reveals that the combined effect
of a low collision energy resonance and high initial
diatomic vibrational excitation can lead to a large
enhancement of the vibrational relaxation cross section.
However even in the absence of resonances the cross
section for very low energies increase with decreasing
energy It is found that this effect increasingly
enhances the contribution of a resonance to the cross
section the closer the resonance is to zero collision
energy. Because the density o resonances near zero
collision energy is small the collision dynamics near
zero collision energy is very sensitive to the nature of
the potential energy surface

DESCRIPTORS   (U) *MOLECULAR VIBRATION, *RESONANCE
SCATTERING RELAXATION TIME, PARTICLE COLLISIONS, LOW
ENERGY HELIUM IODINE CROSS SECTIONS. DIATOMIC
MOLECULES RECOILS

IDENTIFIERS   (U) Vibrational Relaxation, PE611102F.

AD-A172 060

AD-A172 060

AD A172 058   7/4

FLORIDA UNIV GAINESVILLE DEPT OF CHEMISTRY

(U) Atomic Emission/Fluorescence Spectrometry with Second Derivative Wavelength Modulation and Its Application to Analysis of Copper Alloy.

85   11P

PERSONAL AUTHORS: Kurirai,O. ;Davis,L. ;Winefordner,J.D.

CONTRACT NO. F49620-84-C-0002

PROJECT NO. 2303

TASK NO. A1

MONITOR: AFOSR TR-86-0763

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Spectroscopy Letters. v18 n10 p781-789 1985.

ABSTRACT: (U) Atomic emission and fluorescence signals were collected simultaneously with sinusoidal wavelength modulation and detection of the second harmonic mode. The system consisted of a continuum source, argon-separated air/acetylene flame and a wavelength-modulated monochromator. Limits of detection of several elements were measured. This method was applied to the analysis of a copper alloy and Co, Cu, Fe, Mn, Ni, Pb and Zn were successfully determined.

DESCRIPTORS: (U) *ATOMIC SPECTROSCOPY, *EMISSION SPECTROSCOPY, FLUOESCENCE MODULATION, ZINC, COPPER ALLOYS, COBALT, COPPER, IRON, MANGANESE, LEAD(METAL), REPRINTS

IDENTIFIERS: (U) Wavelength modulation, Atomic emission, Atomic fluorescence, PE61102F, WUAFOSR2303A1

AD-A172 058

AD A172 059   7/3

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Inverse Deuterium Isotope Effect in the Intersystem Crossing of Diphenylcarbene.

DESCRIPTIVE NOTE: Rept. for 1984-1985.

FEB 86   5P

PERSONAL AUTHORS: Langan,J.G. ;Sitzmann,E.V. ;Eisenthal,K.B.;

CONTRACT NO. AFOSR-84-0013

PROJECT NO. 2303

TASK NO. B2

MONITOR: AFOSR TR-86-0754

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Chemical Physics Letters. v124 n1 p59-62. 7 Feb 86.

ABSTRACT: (U) The singlet-to-triplet intersystem crossing rate k sub ST of diphenylcarbene (DPC) is found to exhibit an inverse isotope effect in various solvents. An off-resonance coupling model between the initial singlet state and a sparse triplet vibronic manifold accounts for k sub ST showing both an inverse isotope effect in a given solvent as well as an inverse energy gap effect in a solvent series.

DESCRIPTORS: (U) *CARBENES, *PHENYL RADICALS, *DEUTERIUM, *ISOTOPE EFFECT, TRANSPORT PROPERTIES, SOLVENTS, RESONANCE, COUPLING(INTERACTION), ELECTRONIC STATES, MOLECULAR VIBRATION, ENERGY GAPS, POLARITY, REPRINTS

IDENTIFIERS: (U) Crossing, Dibenzocycloheptadienylidene, Isooctane, Singlet states, Triplet states, PE61102F, WUAFOSR230392

AD-A172 059

AD-A172 057   20 12   20/2

MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

(U) Single Crystal Films of Semiconductors on Amorphous Substrates Via a Low Temperature Graphoepitaxy.

DESCRIPTIVE NOTE: Annual technical rept. 1 Mar 85-28 Feb 86.

APR 86   18P

PERSONAL AUTHORS: Smith, Harry I.

CONTRACT NO: AFOSR 85 0154

PROJECT NO: 2305

TASK NO: B2

MONITOR: AFOSR TR 86 0751

UNCLASSIFIED REPORT

ABSTRACT   (U) The objective of this program is to carry out basic research in order to acquire fundamental understanding which will permit the development of a general low temperature process for obtaining oriented or direct free single crystal semiconductor films on amorphous substrates.

DESCRIPTORS: (U) *SEMICONDUCTING FILMS, *SINGLE CRYSTALS, *SUBSTRATES, AMORPHOUS MATERIALS, BEAM GROWTH, SURFACE ENERGY, ION BOMBARDMENT, GERMANIUM, SILICON, DOPING, PHOSPHORUS, ARSENIC, BORON, ZONE MELTING, RECRYSTALLIZATION

IDENTIFIERS: (U) SEDSG, Surface Energy Driven Grain Growth, FERMI ENERGY, PE61102F, WUAFOSR2305B2

AD-A172 057

AD-A172 055   7/4

TEXAS UNIV AT AUSTIN DEPT OF PHYSICS

(U) High Resolution Electron Energy Loss Studies of Chemisorbed Species on Aluminum and Titanium.

DESCRIPTIVE NOTE: Final rept. 1 Apr 83-31 Mar 86.

APR 86   14P

PERSONAL AUTHORS: Erskine, J. L.

CONTRACT NO: AFOSR 83-0131

PROJECT NO: 2303

TASK NO: A2

MONITOR: AFOSR TR-86-0750

UNCLASSIFIED REPORT

ABSTRACT   (U) This project utilized high resolution electron energy loss spectroscopy to investigate chemical processes at metal surfaces. The research during the grant period being reported has been highly successful in a) advancing the state of the art in instrumentation, b) developing lattice dynamical techniques for calculating the vibrational properties of surfaces and demonstrating the application of these techniques to structure determination, c) exploring the application of vibrational spectroscopy to novel underlayer formation occurring as a consequence of chemisorption on Al and Ti surfaces, d) examining some of the fundamental issues related to scattering mechanisms, and selection rules that govern them. Our experiments have also uncovered an interesting relationship between the surface vibrational properties and the order-disorder phase transformation of W(100).

DESCRIPTORS: (U) *SURFACE CHEMISTRY, *ELECTRON SPECTROSCOPY, MOLECULAR VIBRATION, CHEMISORPTION, PHONONS, LATTICE DYNAMICS, ORDER-DISORDER TRANSFORMATIONS, TUNGSTEN, ALUMINUM, TITANIUM, VIBRATIONAL SPECTRA, NICKEL, RESEARCH MANAGEMENT

IDENTIFIERS: (U) Vibrational spectroscopy, EELS Electron Energy Loss Spectroscopy, PE61102F, WUAFOSR2303A2

AD-A172 055

AD-A172 052

CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

(U) QUEL as a Data Type.

DESCRIPTIVE NOTE

DEC 83   25P

PERSONAL AUTHORS Stonebraker,Michael ;Anderson,Erika ; Hanson,Eric ;Rubenstein,Brad ;

REPORT NO. UCB/ERL/M83/73

CONTRACT NO. AFOSR-83-0254

PROJECT NO. 2304

TASK NO. A2

MONITOR: AFOSR TR-86-0781

UNCLASSIFIED REPORT

ABSTRACT .(U) This paper explores the use of commands in a query language as an abstract data type (ADT) in data management systems. Basically, an ADT facility allows new data types, such as polygons, lines, money, time, arrays, of floating point numbers, bit vectors, etc. to supplement the built-in data types in a data base system In this paper we demonstrate the power of adding a data type corresponding to commands in a query language. We also propose three extensions to the query language QUEL to enhance its power in this augmented environment. (Author)

DESCRIPTORS: (U) ;COMPUTER PROGRAMMING; ;INSTRUCTIONS. DATA BASES. DATA MANAGEMENT INTERROGATION. COMPUTER OPERATORS. FLOATING POINT OPERATION. POLYGONS. LINES(GEOMETRY). MONEY. TIME. ARRAYS

IDENTIFIERS: (U) ADT(Abstract Data Type). Data base management systems. QUEL programming language. PE61102F. WUAFOSR2304A2

AD-A172 052

AD-A172 053

SRI INTERNATIONAL MENLO PARK CA

(U) Semiconductor Engineering for High Speed Devices.

DESCRIPTIVE NOTE Quarterly Rept no 3 1 Jan-31 Mar 86 .

MAR 86   6P

PERSONAL AUTHORS Sher,A ;Krishnamurthy,S ;Chen,A B .

CONTRACT NO F49620-85-C-0103 ARPA Order-5396

PROJECT NO 0053

TASK NO 96

MONITOR AFOSR TR-86-0799

UNCLASSIFIED REPORT

ABSTRACT .(U) This report summarizes accomplishments during the 3rd Quarterly reporting period Our aim has been to improve the accuracy of the model described in the previous report an to predict v-E behavior in various alloys The two valley single electron temperature model was further generalized to calculate v-E characteristics without assuming a constant energy relaxation time As the electric field is increased, the average energy of electrons increases. Electrons lose some energy to the lattice The rate of energy loss is calculated b, assuming that energy transfer takes place only through longitudinal optical phonons Based on our preliminary calculations we conclude that alloys with constituent materials that exhibit an indirect gap are not suited for high speed devices However there are some interesting features to their behavior e.g. a large negative temperature coefficient of the mobility which could prove to be useful in temperature sensors

DESCRIPTORS (U) ;SEMICONDUCTORS ;ALLOYS ;TEMPERATURE MEASURING INSTRUMENTS ELECTRONS. INDIUM PHOSPHIDES. PHONONS ENERGY TRANSFER MOBILITY GALLIUM PHOSPHIDES. ANTIMONIDES

IDENTIFIERS (U) Speeds(High) Lattices(Crystal). Optical phonons. Gallium indium. Indium Arsenides

AD-A172 053

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVN54B

AD-A172 047   7..3

AKRON UNIV OH INST OF POLYMER SCIENCE

(U) Time-Dependent Response and Fracture of Cross-Linked
Polymer.

DESCRIPTIVE NOTE   Final rept. Jan 83-Dec 86.

DEC 86   36P

PERSONAL AUTHORS   Kelley,F. N. ;Morton,M. ;Plazek,D.

CONTRACT NO   F49620-83-C-0012

PROJECT NO   2303

TASK NO   A3

MONITOR   AFOSR
TR 86-0695

ABSTRACT   (U)   This study was concerned with the
synthesis, preparation and characterization of cross
linked polymers, and their time dependent fracture
behavior. Emphasis was given to well-defined polymer
network structures of two types - i end liquid
terminall functional polymers having nearly
uniform or deliberately distributed initial chain lengths
and (2) model glassy network in which the network
topology was varied with respect to chain length per
cross link and network defects such as dangling ends and
soluble fraction. Also, a model rubber toughened rubber
was developed by dispersing well characterized rubber
particles made separately from the matrix into various
matri resin. Thermally stable poly-n-butyl acrylate
based particles, cross-linked and functionalized had
the f size and size distribution controlled by the
polymer ation method. Differences were observed in the
fracture energies of the individual matrix resin
containing different rubber particle sizes and particle
reactivity. The model composite fracture energies depend
mainly when plotted against weight percent particles
theoretical model for rubber toughening by Kunz (Bougua
et al) was examined but this model was shown to be
inadequate in predicting the composite fracture energy
dependence on constituent properties, as well as
predicting the correct functional form

AD-A172 050   14 2   20 6

NORTHWESTERN UNIV EVANSTON IL DEPT OF CHEMISTRY

(U) Pulsed Laser Processes on Surfaces. Formation of
Structural Defects. Measurement of Surface Diffusion
and Direct Detection of Reaction Intermediates

DESCRIPTIVE NOTE   Final rept. 1 Jul 84 30 Dec 85.

FEB 86   5P

PERSONAL AUTHORS   Stair,Peter C

CONTRACT NO   AFOSR 84 0199

PROJECT NO   2 03

TASK NO   A?

MONITOR   AFOSR
TR 86 0739

ABSTRACT   (U)   Research Projects Making Use of the Above
Equipment The Role of Surface Structural Defects in
Surface Chemistry The Formation and Surface Chemistry of
Laser Induced Defects The Nature of Catalytically Active
Surfaces and The Mechanics of Las   ed Film Breakdown

AD A1?2 04?   11 6   20 1?

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

U: Strength and Structure of Ga1-xInxAs Alloys,

DESCRIPTIVE NOTE: Quarterly rept no 1, 1 Oct 31 Dec 85

JAN 86   7P

PERSONAL AUTHORS: Faber Katherine T ; Hirth John P

CONTRACT NO: F49620-85-C-0129   ARPA Order-5526

PROJECT NO: 5526

TASK NO: DO

MONITOR: AFOSR
TR-86-0?96

UNCLASSIFIED REPORT

ABSTRACT: (U) Substantial solid solution strengthening of GaAs by In acting as InAs4 units has recently been predicted. This strengthening could account for the reduction of dislocation density in GaAs single crystals grown from the melt. Our objective is to investigate the mechanism by which strengthening is produced by In additions to GaAs. In the first stages of this study experimental measurements of hardness as a function of temperature and In content are reported.

DESCRIPTORS: (U) *GALLIUM ARSENIDES, INDIUM COMPOUNDS, CRYSTAL GROWTH, SOLID SOLUTIONS, SINGLE CRYSTALS, CRYSTAL STRUCTURE, DISLOCATIONS, CRYSTAL DEFECTS, HARDNESS, ARSENIDES, ADDITIVES

IDENTIFIERS: (U) *Gallium Indium Arsenides, LPN OSURF, ?64977-717536, WUAFOSR55260J PE61102F

AD A172 042

AD A1?2 04?   ?? ?????

DESCRIPTORS: *POLYMERS, *ACRYLATES, *EPOXY RESINS,
*ISOPRENE, ?????? *CHEMISTRY, *CROSSLINKING, CHEMISTRY
LIQUIDS, HYDROGEN, *RADICALS, REPRINTS

IDENTIFIERS: ? ? *RESINS, PE611102F, WUAFOSR?2928?3

AD A1?2 04?

PITTSBERG... ... MATHEMA...

(U) Multivariate ... nonparametric ... report

DESCRIPTIVE NOTE: Technical rept

JAN 85 ...

PERSONAL AUTHORS: Block,Henry W ; Savits,Thomas H

REPORT NO: TR 85-...

CONTRACT NO: N00014-84-K-0084 AFOSR 84-0113

PROJECT NO: 2304

TASK NO: A5

MONITOR: AFOSR TR 86-0...

UNCLASSIFIED REPORT

ABSTRACT: (U) Multivariate nonparametric classes have been proposed as early as 1970. For background and references as well as some discussion of univariate classes with multivariate generalizations in mind see Block and Savits (1981). This paper describes only a few fundamental developments prior to 1981 and focuses on developments since then. The coverage will not be exhaustive but will emphasize the topics which the authors feel are most important. Section 2 deals with multivariate nonparametric classes. In section 2.1 multivariate IFRA is discussed with emphasis on the Block and Savits 1980 class. Multivariate NBU is covered in Section 2.2 and multivariate IFR are considered in Section 2.4 and in Section 2.5 the topics of multivariate DMRL and HNPUE are touched on

DESCRIPTORS: (U) *MULTIVARIATE ANALYSIS, *NONPARAMETRIC STATISTICS, RELIABILITY, SURVEYS, INEQUALITIES

IDENTIFIERS: (U) IFR, Increasing Failure Rate, Univariate analysis, WUAFOSR2304A5, PE61102F

TEXAS UNIV AT AUSTIN DEPT OF ELECTRICAL AND COMPUTER ENGINEERING

(U) A Well Posedness Property of a Class of Variational Problems and Its Application to Nonlinear Estimation

DESCRIPTIVE NOTE: Rept for 1 Oct 80-31 Oct 85

APR 85 8p

PERSONAL AUTHORS: Morrison,John H. ; Wise,Gary L

CONTRACT NO: AFOSR-81-0047 AFOSR-86-0026

PROJECT NO: 2304

TASK NO: A5

MONITOR: AFOSR TR 86-0794

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Presented at the Annual Allerton Conference on Communication Control and Computing (23rd) Monticello, IL, 2-4 Oct 85

ABSTRACT: (U) In this paper we consider a class of nonlinear estimators that are the solutions to a certain variational problem. These estimators generalize the concept of conditional expectation. we investigate their continuity and convergence properties. (Author)

DESCRIPTORS: (U) *ESTIMATES, *CONVERGENCE, *MEAN, *NONLINEAR SYSTEMS, *LEAST SQUARES METHOD, *APPROXIMATION(MATHEMATICS), *CONTINUITY, ERROR ANALYSIS, OPERATORS(MATHEMATICS)

IDENTIFIERS: (U) SPACES, ORLICZ SPACES, CONDITIONAL EXPECTATION ESTIMATION, NONLINEAR ESTIMATION, HILBERT SPACE, PROJECTIONS(NORM), ESTIMATOR CONVERGENCE, NONEXPANSIVE OPERATIONS, THEOREM PROJECTION, SUBSPACES(CLOSED), LINEAR OPERATORS, WUAFOSR2304A5, PE61102F

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 030   12/1   6,5

FLORIDA STATE UNIV TALLAHASSEE   DEPT OF STATISTICS

(U) Exact Significance Testing with Biased Coin Randomization

DESCRIPTIVE NOTE: Technical rept

JUN 85   19P

PERSONAL AUTHORS: Hollander Myles ; Pena Edsel .

REPORT NO: FSU STATISTICS-M728, TR 86-189 AFOSR

CONTRACT NO: F49620-85-C-00...

PROJECT NO: 2304

TASK NO: A5

MONITOR: AFOSR
    TR 86-0603

UNCLASSIFIED REPORT

ABSTRACT: (U)   For a clinical trial where two treatments have been assigned sequentially to patients with Efron's (1971) biased coin design a recursion procedure is derived for obtaining the exact randomization distribution of a class of test statistics. This enables one to perform exact significance tests of the hypothesis of no treatment difference in a randomization distribution of the statistic is conditioned on the imbalance of the treatment location. It is illustrated that if the analysis is performed as if complete randomization was used. Conservative and anticonservative errors can be incurred. The replicability of the test is censored data is also discussed. Author

DESCRIPTORS: (U)   *STATISTICAL TESTS, *CLINICAL MEDICINE, STATISTICAL DISTRIBUTION, PROBABILITY, PATIENTS, MARKOV PROCESSES, COMPUTATIONS, FORTRAN, COMPUTERIZED SIMULATION, RANDOM VARIABLES, BIAS.

IDENTIFIERS: (U)   *Significance tests, Biased coin design WUAFOSR2304A5, PE61102F

AD-A172 030

DTIC REPORT BIBLIOGRAPHY

AD-A172 031   12/1

CALIFORNIA UNIV DAVIS INTERCOLLEGE DIV OF STATISTICS

(U) Hazard Rate Estimation for Censored Data via Strong Representation of the Kaplan Meier Estimator

DESCRIPTIVE NOTE: Technical rept

AUG 85   35P

PERSONAL AUTHORS: Lo S. H. ; Mack Y. P. ; Wang J. L.

REPORT NO: USD STATISTICS-CS 64

CONTRACT NO: AFOSR 85-0268

PROJECT NO: 4

TASK NO: A5

MONITOR: AFOSR
    TR 86-0691

UNCLASSIFIED REPORT

ABSTRACT: (U)   This document studies the estimation of a hazard rate function based on censored data by the kernel smoothing method. Our technique is facilitated by a recent result of Lo and Singh (1985) which establishes a strong uniform approximation of the Kaplan Meier estimator in the form of an average of independent random variables with a remainder term of negligible order. As a consequence the asymptotic normality and mean squared error expressions for our estimators are obtained with the aid of a normal result. As obtained with the aid of techniques employed by Lo and Singh (1985). Author

DESCRIPTORS: (U)   *ESTIMATES, *ANALYSIS, *HAZARDS, *APPROXIMATION(MATHEMATICS), *KERNEL FUNCTIONS, RANDOM VARIABLES, ASYMPTOTIC NORMALITY, CONSISTENCE

IDENTIFIERS: (U)   Kaplan Meier estimator, Hazard rate, Smoothing, Estimators, Censored data, WUAFOSR2304A5, PE61102F

AD-A172 031

SEARCH CONTROL NO EVN548

AD A172 028 4/2

COLORADO STATE UNIV FORT COLLINS DEPT OF ATMOSPHERIC SCIENCE

(U) The Atmospheric Heat Budget Over the Western Part of the Tibetan Plateau During MONEX 1979.

DESCRIPTIVE NOTE: Technical rept.

NOV 85 16P

PERSONAL AUTHORS: Zhigiang,Feng ;Reiter,Elmar R. ;Longxun, Chen ;

CONTRACT NO AFOSR-82-0162

PROJECT NO 2310

TASK NO A1

MONITOR AFOSR TR-86-0740

UNCLASSIFIED REPORT

ABSTRACT: (U) The atmospheric heat source strength over western Tibet has been computed for the period beginning with the last ten days in May, 1979 and extending through August, 1979. Our results show a significantly smaller heat source than that obtained by other authors. The discrepancy is mainly due to adjustments in the drag coefficient suggested by observations and numerical modeling experiments. In the north, sensible heating, SH, provides the dominant input into the atmospheric heat source, whereas in the southern part latent heat, LP, offers a significant contribution after the start of the rainy season. Detailed heat budget calculations were also carried out over limited regions of southwestern Tibet which had good station coverage. During periods with area-averaged rainfall <1 mm/day an atmospheric heat source maximum was located over southwestern Tibet near the 500 hPa level while a heat sink dominated the upper troposphere in a layer of subsidence. When rainfall exceeded 4 mm/day, ascending motions and heat sources prevailed throughout the troposphere with maxima near 400 hPa. Time series analyses of the heat source components show that the total atmospheric heat source is strongly modulated by the release of latent heat. Atmospheric

AD-A172 028

FLORIDA STATE UNIV ... ...

(U) Supports of BIB (Balanced Incomplete Block) Designs An Algebraic and Graphical Study.

DESCRIPTIVE NOTE: Technical rept.

MAR 86 50P

PERSONAL AUTHORS: Foody,W ;Hedayat,A

REPORT NO TR-86-02

CONTRACT NO AFOSR-85-0320

PROJECT NO 2304

TASK NO A5

MONITOR AFOSR TR-86-0625

UNCLASSIFIED REPORT

ABSTRACT: (U) The structure and the size of the supports of balanced incomplete block (BIB) designs are explored. The concepts of fundamental BIB designs is introduced and its usefulness in can be reduced via a technique call trade on a design & new graphical method of studying the supports of BIB designs with blocks of size three is introduced. Several useful results are obtained via this graphical method. In particular, it is shown that no BIB design with seven varieties in blocks of size three can be built based on sixteen distinct blocks. Contributions made here have immediate applications in controlled experimental designs and survey samplings.

DESCRIPTORS: (U) *EXPERIMENTAL DESIGN, *GRAPHICS, OPTIMIZATION, MATHEMATICAL PROGRAMMING, GRAPHS, SET THEORY

IDENTIFIERS: (U) BIB(Balanced Incomplete Block), PE61102F, WUAFOSR2304A5

AD-A172 029

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 028   CONTINUED

AD-A172 027   12/1

PRINCETON UNIV NJ DEPT OF ELECTRICAL ENGINEERING AND
COMPUTER SCIENCE

(U) A Class of Low-Noise Computationally Efficient
Recursive Digital Filters with Applications to
Sampling Rate Alterations.

radiational cooling reveals a phase shift in its relation
with precipitation During the first part of the
observation period a correlation of that cooling exists
mainly with the net radiation at the top of the
atmosphere during the last part with the net radiation
at the ground

FEB 85   10P

PERSONAL AUTHORS   Ansari,Rashid ;Liu,Bede ;

CONTRACT NO   AFOSR-81-0186

PROJECT NO.   2304

TASK NO   A6

MONITOR   AFOSR
TR 86 0715

DESCRIPTORS (U) *TROPOSPHERE *HEAT *FLARFAYS CHINA
WEST DIRECTION SOURCES VARIATIONS STATISTICAL
ANALYSIS. REPRINTS

IDENTIFIERS (U) Heat budget WUA/GRPP-001 PEG11025

SUPPLEMENTARY NOTE: Pub in IEEE Transactions on
Acoustics, Speech, and Signal Processing, VASSP 33 n1 p90
97 Feb 85

ABSTRACT: (U)   A new structure for multiband recursive
digital filters is proposed for meeting low pass filter
specifications. It uses fewer multiplications than
conventional elliptic filter realizations. An
approximation to the minimax solution is obtained
numerically by minimizing the P error norm. The analytic
optimum for odd order low pass filters of this new class
turns out to be the elliptic filter itself, but in a new
configuration Analytic solution is also obtained for
filters used in decimation interpolation by a factor of 2
There are several realizations for this new structure
the choice of which depends on the location of poles and
zeros Some selected realizations always have low
roundoff noise and small limit cycle bounds

DESCRIPTORS   (U)   *DIGITAL FILTERS, *RECURSIVE FILTERS
*LOW PASS FILTERS, *TRANSFER FUNCTIONS, *SAMPLING, NOISE
ADDITION ERRORS. MULTIPLICATION. SPECIFICATIONS. FAIR
PRODUCTION. CIRCLES. INTERPOLATION HIGH PASS FILTERS.
BANDPASS FILTERS. REPRINTS

IDENTIFIERS   (U)   *Filter architecture *Multiband

AD-A172 027

AD-A172 028

AD-A172 026   12 1

PRINCETON UNIV NJ DEPT OF ELECTRICAL ENGINEERING AND
COMPUTER SCIENCE

(U) A Robust Conjugate Directions Method for Solving
Linear Systems.

OCT 84   10P

PERSONAL AUTHORS: Sullivan,Barry J. ;Liu,Bede ;

CONTRACT NO   AFOSR-81-0186

PROJECT NO.   2304

TASK NO   A6

MONITOR: AFOSR
TR-86-0717

UNCLASSIFIED REPORT

ABSTRACT: (U)   The method of conjugate gradients is the
most popular of several conjugate directions methods. In
this paper, a second conjugate directions method, known
as A-minimal iterations, is examined. It differs from
conjugate gradients primarily in that the direction
vectors are computed in a manner independent of the
observations. When the observations are the dominant
noise source in the problem, this difference makes A-
minimal iterations the more robust of the two methods.
Examples from the area of signal extrapolation support
this assertion. (Author)

DESCRIPTORS: (U)   *Iterations, *LINEAR SYSTEMS, PROBLEM
SOLVING, SIGNALS, EXTRAPOLATION, REPRINTS

IDENTIFIERS: (U)   *Robust procedures, PE61102F
WUAFOSR2304A6

AD-A172 026

UNCLASSIFIED   PAGE   230   EVN54B

BIBLIOGRAPHY OF REPORTS   (CONTINUED)

AD-A172 027   (CONTINUED)

Filters, Elliptic filters, Odd orders, Pole locations,
Zero location, Lattice filters, Computation reduction,
Unit circles, Estimation, Cycle bounds,
Efficiency,Computational, Rounding noise, Butterworth
filters, Pairing,Pole zero, PE61102F, WUAFOSR2304A6

AD-A172 027

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 024   20 2   20 6   AD-A172 022   20 5   20 6

PENNSYLVANIA UNIV PHILADELPHIA DEPT OF PHYSICS   ILLINOIS UNIV AT URBANA CHARGED PARTICLE RESEARCH LAB

(U) Nonlinear Optical Processes in Organic and Polymeric   (U) Luminescent Characteristics Study of Mather-Type Dense
Crystals and Films   Plasma Focus and Applications to Short-Wavelength
                                                                       Optical Pumping.

DESCRIPTIVE NOTE: Final rept for period ending 14 May 85   DESCRIPTIVE NOTE: Final technical rept. 1 May 84-30 Sep
                                                                     85.
  APR 86   8P

PERSONAL AUTHORS Garito,A F   JUN 86   37P

CONTRACT NO   AFOSR 84 0135   PERSONAL AUTHORS: Kim,Kyekyoon K. ;

PROJECT NO   2303   REPORT NO   CPRL-2-86, UILU-ENG-86-2551

TASK NO   A3   CONTRACT NO   AFOSR-84-0138

MONITOR   AFOSR   PROJECT NO   2301
          TR 85 0606
                                                                 TASK NO   K1
        UNCLASSIFIED REPORT
                                                                 MONITOR   AFOSR
                                                                           TR-86-0688

                                                                         UNCLASSIFIED REPORT

ABSTRACT   U   Physical studies have demonstrated that
organic and polymer structures possess unusually large,
ultrafast second and third order nonlinear optical
properties, in a large number of material structures.
phases and states that include organic crystals.
monomolecular films, polymer structures, liquid crystals
and liquid crystal polymers. For two such polymer systems,
PBI and PBT, third harmonic generation measurements show
that they possess large non-resonant third order optical
susceptibilities whose origin resides in ultrafast,
lossless excitations of highly charge correlated pi-
electron states. Multilayer thin films have been
fabricated in organic superlattices by the Langmuir-
Blodgett technique to produce finite sequences of from
one to several hundred molecular monolayers of different
amphiphilic molecules. When one of the molecules contains
a pi electron system the macroscopic nonlinear optical
properties of such thin films can be controlled

ABSTRACT   U   A Mather type dense plasma focus (MDPF)
system was designed, built and tested specifically to
study its luminescent characteristics and to assess its
potential as a new light source of high energy, short
wavelength lasers. The luminescence study of MDPF showed
that the conversion efficiency from the electrical input
to the optical output energies is at least 50 , up to the
time the plasma compression is complete. Using the system
for the first time as an optical pump, laser activities
were successfully obtained from a variety of liquid
organic dyes. Diagnostic capabilities included an optical
multichannel analyzer system complete with a computer
control, a nitrogen pumped tunable dye laser system, a
high speed streak/framing camera, a digital laser energy
meter, voltage and current probes, and a computer based
data acquisition system

DESCRIPTORS   (U) *POLYMERS, *LIQUID CRYSTALS, *ORGANIC
COMPOUNDS, *THIN FILMS, EXCITATION ELECTRONIC STATES,
PHONONS, VIBRATION, OPTICAL PROPERTIES, HARMONICS,
MEASUREMENT

DESCRIPTORS (U)   *DYE LASERS, *OPTICAL PUMPING,
PLASMAS(PHYSICS), LUMINESCENCE, ULTRAVIOLET LASERS,
EMISSION SPECTRA, EFFICIENCY, TUNABLE LASERS, STREAK
CAMERAS, HIGH SPEED PHOTOGRAPHY, BREAKDOWN(ELECTRONIC
THRESHOLD)

IDENTIFIERS   ORGANIC CRYSTALS, AMPHIPHILIC
MOLECULES, SUPERLATTICES, PE61102F

AD-A172 024   AD-A172 022

SEARCH CONTROL NO. EVN54B

AD-A172 015   7/3

CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF CHEMISTRY

(U) Synthetic, Structural, Spectroscopic, and Theoretical
Studies of Decamethylvanadocene Arylnitrenes.

85   9P

PERSONAL AUTHORS: Osborne,Joseph H. ;Rheingold,Arnold L. ;
Trogler,William C ;

CONTRACT NO.   AFOSR-84-0021

PROJECT NO.   2303

TASK NO.   B2

MONITOR: AFOSR
TR-86-0726

UNCLASSIFIED REPORT

ABSTRACT: (U)   Studies of metal oxo complexes have led to
the development of reagents and catalysts for selective
oxidations of organic substrates. Isoelectronic metal-
nitrene or imido complexes have received less attention
but may prove useful for transferring N-R groups to
organic molecules. Most examples of metal-nitrene
complexes have been of high oxidation state coordination
complexes. Properties of organometallic nitrenes need
further definition. Our group has been interested in the
properties of unsaturated metal-nitrogen complexes.
Herein we report syntheses of a family of arylnitrenes of
decamethylvanadocene, structural studies of the 2,6-
dimethylphenyl derivative, spin-polarized theoretical
calculations, electrochemical oxidations, and EPR
spectroscopic studies.

DESCRIPTORS: (U)   *ORGANOMETALLIC COMPOUNDS, *ARYL
RADICALS, *VANADIUM COMPOUNDS, *COMPLEX COMPOUNDS,
NITROGEN COMPOUNDS, SYNTHESIS(CHEMISTRY), CHEMICAL
REACTIONS, MOLECULAR STRUCTURE, ELECTRON PARAMAGNETIC
RESONANCE, REPRINTS

IDENTIFIERS: (U)   *ARYLNITRENES, WUAFOSR2303B2, PE61102F

AD-A172 015

AD-A172 022   CONTINUED

IDENTIFIERS   (U)   MDPF Mother Type Dense Plasma Focus,
Laser diagnostics, Blue Green Lasers, WUAFOSR2301K1,
PE61102F

AD-A172 022

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

Entry 1

AD-A172 009   20/6

ARIZONA UNIV TUCSON OPTICAL SCIENCES CENTER

(U) Research in the Optical Sciences.

DESCRIPTIVE NOTE: Final rept. 1 Oct 79-30 Jun 85.

JUL 85   86P

PERSONAL AUTHORS: Shannon,Robert R. ;

CONTRACT NO: F49620-80-C-0022

PROJECT NO: 2301

TASK NO: A1

MONITOR: AFOSR
TR-86-0632

UNCLASSIFIED REPORT

ABSTRACT: (U) Contents: A Search for Optical Bistability in Thin Evaporated Films; Long Range Surface Plasmon Polaritons; Nonlinear Guided Wave Interactions; Theory of Two Photon Doppler Free Spectroscopy; X Ray Image Intensifiers with Electronic Readout; Optical Bistability, Optical Bistability Experiments to Improve solid state Devices and Basic Understanding; Modulated Emittance Spectroscopy; High Resolution Wavefront Sensing Through the Atmosphere. Aberrated Gaussian Beams. Ion beam Processing of Optical Coatings on Plastics. Optical Coatings for the X Ray to Ultraviolet Wavelength Range

DESCRIPTORS: (U) OPTICS, OPTICAL PROPERTIES. STABILITY THIN FILMS. PLASMONS. ULTRAVIOLET SPECTRA. RESEARCH MANAGEMENT. WAVEFRONTS. DETECTION. HIGH RESOLUTION SPECTROSCOPY. OPTICAL COATINGS. X RAY APPARATUS. SOLID STATE ELECTRONICS. IMAGE INTENSIFIERS. ELECTRONICS GAUSSIAN QUADRATURE. LASER BEAMS.

IDENTIFIERS: (U) Optical bistability. Polaritons. WUAFOSR2301A1, PE61102F

AD A172 009

Entry 2

AD-A172 013   12/2

GEORGIA INST OF TECH ATLANTA

(U) Extreme Values of Queues, Point Processes and Stochastic Networks.

DESCRIPTIVE NOTE: Annual technical rept. 30 Sep 84-30 Sep 85.

NOV 85   12P

PERSONAL AUTHORS: Serfozo,Richard F.

CONTRACT NO: AFOSR-84-0367

PROJECT NO: 2304

TASK NO: A5

MONITOR: AFOSR
TR-86-0721

UNCLASSIFIED REPORT

ABSTRACT: (U) Work progressed on four topics in modeling of stochastic flows in networks. compound Poisson approximations for random variables and point processes were developed. In extremal problems in stochastic networks, a family of bounds for the distributions of certain queueing flow variables were obtained. In optimization of queueing systems, progress was made on determining ways to route to or dampen extreme values of queues. Finally, some work was begun on extreme values of queues and point processes. (Author)

DESCRIPTORS: (U) NETWORK FLOWS, QUEUEING THEORY. MATHEMATICAL MODELS. OPTIMIZATION. STOCHASTIC PROCESSES. APPROXIMATION MATHEMATICS. RANDOM VARIABLES. POINTS MATHEMATICS.

IDENTIFIERS: (U) WUAFOSR2304A5. PE61102F

AD A172 013

UNCLASSIFIED

AD-A172 007

CALIFORNIA UNIV RIVERSIDE DEPT OF STATISTICS

(U) Influential Nonnegligible Parameters Under the Search
    Linear Model

DESCRIPTIVE NOTE   Interim rept.

APR 86   16P

PERSONAL AUTHORS   Ghosh Subir

REPORT NO.   TR 141

CONTRACT NO.   AFOSR-86-0048

PROJECT NO   2304

TASK NO.   A5

MONITOR   AFOSR
           TR-86 0733

UNCLASSIFIED REPORT

ABSTRACT   (U)   In this paper some results useful in
detecting the Influential Nonnegligible parameters under
the search linear model are presented. An estimator of
the number of nonnegligible parameters which are
significant and influential is also given.

DESCRIPTORS   (U)   *FACTORIAL DESIGN. LINEAR SYSTEMS.
MATHEMATICAL MODELS. SEARCHING

IDENTIFIERS   (U)   Design models. WUAFOSR2304A5. PE61102F

AD-A172 006   20/6   /6/5

PENNSYLVANIA STATE UNIV   UNIVERSITY PARK DEPT OF PHYSICS

(U) Hole Gratings and Diffraction of Gaussian Beams.

DESCRIPTIVE NOTE   Final rept   1 Jul 83-31 Dec 84.

MAR 86   13P

PERSONAL AUTHORS   Wiggins, T. A. ;

CONTRACT NO.   AFOSR-83-0258

PROJECT NO.   2306

TASK NO.   D9

MONITOR   AFOSR
           TR-86-0641

UNCLASSIFIED REPORT

ABSTRACT   (U)   Methods for the determination of waist
size and position for Gaussian beams are summarized and
an alternative method which applies to pulse systems was
proposed and tested. The general theory of Fraunhofer
diffraction of Gaussian beams was developed which
permitted a new method for location of laser waists. An
extension to Fresnel diffraction was proposed. The use of
hole gratings for production of multiple spots for damage
threshold measurements is inherent to this work. The
effects of their characteristics on the intensity profile
are included.

DESCRIPTORS   (U)   *LASER BEAMS, *DIFFRACTION.
GRATINGS(SPECTRA), GAUSSIAN QUADRATURE

IDENTIFIERS   (U)   Gaussian beams. Fraunhofer diffraction.
PE61102F, WUAFOSR2306D9

AD-A172 006

AD-A172 004   12/1

CALIFORNIA UNIV DAVIS INTERCOLLEGE DIV OF STATISTICS

(U) Estimating IFRA (Increasing Failure Rate Average)
    Based on Censored Data.

DESCRIPTIVE NOTE: Technical rept.

NOV 85   21P

PERSONAL AUTHORS: Wang Jane-Ling ;

REPORT NO.   TR-70

CONTRACT NO. AFOSR-85-0268

PROJECT NO.   2304

TASK NO.   A5

MONITOR: AFOSR
              TR-86-0655

UNCLASSIFIED REPORT

ABSTRACT: (U)   This paper considers the problem of
estimating a survival curve from randomly right censored
data when it is known to have increasing failure rate
Average (IFRA) or to be New Better than Used (NBU). Let
F sub n(t) be the product limit estimator (PL-estimator
of Kaplan and Meier for the true distribution. Since F
sub n(t) never has the IFRA property and may not be NBU
we modify F sub n(t) to have the desired IFRA (NBU
properties. The modified estimators are easy to compute
and under mild conditions, are shown to be
asymptotically raised to the 1 2 power equivalent to F
sub n(t) on compact intervals. Thus the modified
estimators share the asymptotic properties of the PL-
estimator F sub n(t). (Author)

DESCRIPTORS: (U)   (DISTRIBUTION CURVES, (NONPARAMETRIC
STATISTICS ESTIMATES DISTRIBUTION FUNCTIONS, INTERVALS
ASYMPTOTIC NORMALITY, SURVIVAL(GENERAL)

IDENTIFIERS: (U)   IFRA(Increasing Failure Rate Average)
NBU(New Better than Used) Censored data. WUAFOSR2304A5
PE61102F

AD-A172 004

AD-A172 005   14/2   17/8   17/1

STANFORD UNIV CA EDWARD L GINZTON LAB OF PHYSICS

(U) Application of Nondestructive Testing Techniques to
    Materials Testing

DESCRIPTIVE NOTE: Annual rept 1 Jan-31 Dec 85.

FEB 86   78P

PERSONAL AUTHORS: Kino G S

CONTRACT NO   AFOSR-84-0063

PROJECT NO   2306

TASK NO   A2

MONITOR   AFOSR
               TR-86-0635

UNCLASSIFIED REPORT

ABSTRACT: (U)   A range of fundamentally new optical
nondestructive techniques has been demonstrated for
meas nonmous of surface defects range surface profiles
and acoustic and thermal displacements of a surface A
wide continuum acoustic beam has been demonstrated to
measure range to a far greater accuracy than with
conventional NDT systems using these probes, the range
resolution of our systems is comparable to a wavelength
within a factor of under a short pulse system or two or
three an automatic technical method using a diagram during the
program has been successful in measuring from
through put for to an accuracy of better than 2000

DESCRIPTORS: (U)   (NONDESTRUCTIVE TESTING, (ACOUSTIC
MICROSCOPES, (ACOUSTOOPTICS OPTICAL MATERIALS, SURFACE
ROUGHNESS DISPLACEMENT THIN FILMS ACOUSTIC BEAMS,
RESOLUTION MIRRORS OPTICAL DETECTION ACCURACY, DATA
ACQUISITION PHOTOLITHOGRAPHY MANUFACTURING

IDENTIFIERS: U   WUAFOSP2306A2 PE61102F

AD A172 002   6 16   5 4   9 2

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF PSYCHOLOGY

(U) Human Information Processing of Targets and Real-World
     Scenes.

DESCRIPTIVE NOTE   Final rept 1 Apr 83-31 Aug 85,

     JUL 85   83P

PERSONAL AUTHORS   Biederman,Irving ;

CONTRACT NO   F49620-83-C-0086

PROJECT NO   2313

TASK NO   A5

MONITOR   AFOSR
          TR-86-0675

UNCLASSIFIED REPORT

ABSTRACT   (U)   Substantial progress has been made on an
     empirical and theoretical analysis of human image
     understanding. The theory, termed Recognition-by-
     Components (RBC), holds that the perceptual recognition
     of objects is a process in which the image of the input
     is segmented at regions of deep concavity into simple
     volumetric components. These components can be derived
     from properties of the two dimensional image that are
     invariant over viewing position and image quality, such
     as collinearity and symmetry. Experimental results
     support the sufficiency of RBC in showing efficient
     speeded recognition of objects missing parts or lacking
     color and texture. Also confirmed was a prediction
     derived from RBC that selective contour deletion that
     bridged concavities and prevented retrieval of the
     components would render object identification impossible.
     (Author)

DESCRIPTORS   (U)   *VISION, *VISIONICS, *PATTERN
     RECOGNITION, *IMAGE DISSECTION, *VISUAL PERCEPTION,
     *COMPUTER APPLICATIONS, COMPREHENSION, IDENTIFICATION,
     IMAG PROCESSING, EDGES

IDENTIFIERS   (U)   Understanding(Image), RBC(Recognition
     By Components), Interpretation(Image), Nonaccidentalness,
     Computer vision, Components(Volumetric), Line drawings,

AD-A172 002

AD A172 003   12 1

NORTH CAROLINA UNIV AT CHAPEL HILL CENTER FOR STOCHASTIC
PROCESSES

(U) Spreading and Predictable Sampling for Exchangeable
    Sequences and Processes

DESCRIPTIVE NOTE   Technical rept

MAY 86   44P

PERSONAL AUTHORS   Kallenberg,Olav .

REPORT NO   TR 136

CONTRACT NO   F49620 85 C-0144

PROJECT NO   2304

TASK NO   A5

MONITOR   AFOSR
          TR 86 0658

UNCLASSIFIED REPORT

ABSTRACT   (U)   Ryoll-Nardzewski (1957) proved that an
     infinite sequence of random variables s exchangeable. if
     every subsequence has the same distribution. This
     document discusses some restatements and extensions of
     this result in terms of martingales and stopping times.
     In the other direction, it is shown that the distribution
     of a finite or infinite exchangeable sequence is
     invariant under sampling by means of a.s. distinct (but
     not necessarily ordered) predictable stopping times. Both
     types of result generalize to exchangeable processes in
     continuous time. (Author)

DESCRIPTORS   (U)   *STATISTICAL SAMPLES, *MATHEMATICAL
     PREDICTION, RANDOM VARIABLES, INVARIANCE, DISTRIBUTION
     FUNCTIONS, STOPPING RULES(MATHEMATICS),
     SEQUENCES(MATHEMATICS), STOCHASTIC PROCESSES

IDENTIFIERS   (U)   Martingales, Stopping times(mathematics)
     Pe61102F, WUAFOSR2304A5

AD-A172 003

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A172 002   CONTINUED

Nonrigid objects. Concavity, Degraded images. Matching.
Edge extraction. WUAFOSP2313A5. PE61102F

AD-A171 993   4/1   4/2

BOSTON UNIV MA DEPT OF ELECTRICAL COMPUTER AND SYSTEMS
ENGINEERING

(U) Dynamical - Chemical Coupling in the Mesosphere and
Lower Thermosphere.

DESCRIPTIVE NOTE: Final rept. 1 Jun-1 Dec 84.

JAN 85   4P

PERSONAL AUTHORS   Forbes,Jeffrey M.

CONTRACT NO   AFOSR-84-0182

PROJECT NO   2310

TASK NO   A2

MONITOR   AFOSR
            TR-86-0653

UNCLASSIFIED REPORT

ABSTRACT   (U)   The dynamic ionosphere over Arecibo is
simulated using a finite element technique. It is shown
that the so called "collapse" of the Arecibo F layer is
caused by the upward propagating semidiurnal tide excited
in the upper stratosphere by ozone heating. The steep
underside density gradients observed in conjunction with
the collapse are shown to be due to the shear in the
meridional wind field of the semidiurnal tide. These
gradients are capable of triggering the gradient drift
plasma instability, and accounting for plasma
irregularity formation and observations of VHF
scintillations associated with the collapse phenomenon.

DESCRIPTORS   (U)   ATMOSPHERIC PHYSICS, ATMOSPHERIC
CHEMISTRY, COUPLING INTERACTION, IONOSPHERE, DYNAMICS.
MESOSPHERE, THERMOSPHERE, MATHEMATICAL MODELS, FINITE
ELEMENT ANALYSIS, COLLAPSE, F REGION, ATMOSPHERIC TIDES,
OZONE, HEATING, DENSITY, GRADIENTS, WIND SHEAR,
PLASMAS PHYSICS, IONOSPHERIC SCINTILLATIONS

IDENTIFIERS   (U)   WUAFOSR2310A2, PE61102F

AD A171 998

AD-A171 965   3/2

TUFTS UNIV MEDFORD MA DEPT OF PHYSICS AND ASTRONOMY

(U) Radio Wavelength Observations of Magnetic Fields on
Active Dwarf-M, RS CVn and Magnetic Stars. 18

86   5P

PERSONAL AUTHORS: Lang,Kenneth R. ;

CONTRACT NO   N00014-86-K-0068. AFOSR-83-0019

MONITOR: AFOSR
TR-86-0983

UNCLASSIFIED REPORT

ABSTRACT: (U)   The dwarf M stars YZ Canis Minoris and AD
Leonis exhibit narrow band, slowly varying (hours)
microwave emission that cannot be explained by
conventional thermal radiation mechanisms. The dwarf M
stars AD Leonis and Wolf 424 emit rapid spikes whose high
brightness temperatures similarly require a nonthermal
radiation process which could result from coherent
mechanisms such as an electron cyclotron maser or
coherent plasma radiation. If the electron cyclotron
maser emits at the second or third harmonic of the
gyrofrequency, the coronal magnetic ield strength H =
250 C or 167 G and constraints on the plasma frequency
imply an electron density of N sub e = 6 x 10 to the 9th
power/cc. Coherent plasma radiation requires similar
values of electron density but much weaker magnetic
fields. Radio spikes from AD Leonis and Wolf 424 have
rise times tau sub R < 5 ms, indicating a linear size of
L < 1.5 x 10 to the 8th power cm. or less than 0 005 of
the stellar radius. Although Ap magnetic stars have
strong dipole magnetic fields, they exhibit no detectable
gyroresonant radiation, suggesting that these stars do
not have hot, dense coronae. The binary RS CVn star UX
Arietis exhibits variable emission at 6 cm wavelength on
time scales ranging from 30 s to more than one hour. The
shortest variation implies a linear size much less than
that of the halo observed by VLBI techniques, and most
probably sizes smaller than those of the component stars.
The observed variations might be due to absorption by a
thermal plasma located between the stars.

DESCRIPTORS: (U)   *DWARF STARS, *EMISSION SPECTRA.
*MICROWAVES, CYCLOTRON RESONANCE. COMPARISON. MASERS.

AD-A171 985

UNCLASSIFIED

AD-A171 992   3/6

CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

(U) Joint Services Electronics Program

DESCRIPTIVE NOTE   Annual progress rept 1 May 85-30 Apr
86.

APR 86   418

PERSONAL AUTHORS   Oldham W G

REPORT NO   UCB ERL-86-1

CONTRACT NO   F49620 84 C 0057

PROJECT NO   2305

TASK NO   A9

MONITOR   AFOSR
TR 86-0592

UNCLASSIFIED REPORT

ABSTRACT   (U) An annual report of the JSEP (Joint
Services Electronics Program) in Electromagnetics.
Quantum Electronics. Solid State Electronics. Materials
and Devices and Information System is presented In
addition, results of the research to date are summarized
and significant accomplishments are indicated

DESCRIPTORS (U) *ELECTRONICS. JOINT MILITARY ACTIVITIES.
QUANTUM ELECTRONICS. SOLID STATE ELECTRONICS. INFORMATION
SYSTEMS

IDENTIFIERS (U) Electromagnetics. Materials(Electronic)
Devices.Electronic). WUAFOSR2305A9 PE61102F

AD A171 992

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO   EVN54B

AD-A171 984   12 1

NORTHERN ILLINOIS UNIV DE KALB DEPT OF MATHEMATICAL
SCIENCES

(U) On the Structure of (v,k,t) Trades.

86   14P

PERSONAL AUTHORS: Hwang,H L

CONTRACT NO   AFOSR-85-0320

PROJECT NO   2304

TASK NO   A5

MONITOR   AFOSR
             TR-86 0725

UNCLASSIFIED REPORT

ABSTRACT: (U) The (v,k,t) trades can be utilized to
construct new t-designs from a given t-design. The goal
of this paper is to study the structure of (v,k,t)
trades and to provide information and guidance for
searching trades on a given t-design. Our study shows
that where (or k,t,t) there is no (v,k,t) trade. In
the case (or k,t,t,t) the volume of a (v,k,t)
trade is at least 2 superscript t and can never be 2
superscript t+1. We also characterize the (v,k,t)
trades of volume 2 superscript t, and show that the trades
with minimum volume and minimum foundation size have a
unique structure. These (v,k,t) trades, called minimal
trades, can be utilized to generate trades on a t design.

DESCRIPTORS: (U)   *SET THEORY   *TRADE OFF ANALYSIS.
VOLUME   CLUSTER ANALYSIS MATRICES MATHEMATICS   THEOREMS
PERMUTATIONS INTEGRAL EQUATIONS. STATISTICAL ANALYSIS
REPRINTS

IDENTIFIERS   (U)   *Trades Mathematics   T Design. Blocks
PE61102F WUAFOSR2304A5

AD A171 984

PAGE   239   EVN54

AD A171 985   CONTINUED

SOLAR FLARES PLASMAS PHYSICS   ELECTRON DENSITY

IDENTIFIERS   (U)   Canis minoris Leonis   VLBI very Long
Baseline Interferometry   Gyro resonance

(U) Flare Stars and Solar Bursts: High Resolution in Time and Frequency.

UNCLASSIFIED REPORT

ABSTRACT: (U) Coronal loops on the Sun and nearby stars are investigated using observations at 20 cm wavelength with high resolution in time and frequency. Observations of the dwarf M star AD Leonis with high time resolution using the Arecibo Observatory have resulted in the discovery of a quasi-periodic train of circularly polarized spikes with a mean periodicity of 32 + or - .5 ms and a total duration of 150 ms. The individual spikes had rise times of < or = 5 ms, leading to an upper limit to the linear size L < or = 1.5 x 10 to the 8th power cm for the spike emitter. This size is only 0.005 of the estimated radius of AD Leonis. Provided that the emitter is symmetric, it has a brightness temperature of T sub B > or = 10 to the 16th power K, suggesting a coherent burst mechanism such as an electron cyclotron maser. Coronal oscillations might modulate the maser output producing the quasi-periodic spikes. Observations at closely spaced wavelengths, or high frequency resolution, using the Very Large Array have revealed narrow band structure (Delta nu nu < or = 0.01 in solar bursts and in the slowly varying radiation of the dwarf M star YZ Canis Minoris. The narrow band emission cannot be explained by continuum emission processes, but it might be attributed to electron cyclotron maser radiation. Maser action at the second or first harmonic of the gyrofrequency implies magnetic field strengths of 250 and 500 G respectively. Thus, observations with high resolution in time and frequency suggest coherent processes in the corona of the Sun and dwarf M stars.

(U) Millisecond Radio Spikes from the Dwarf M Flare Star AD Leonis.

UNCLASSIFIED REPORT

ABSTRACT: (U) The Arecibo Observatory was used to detect two circularly polarized bursts at 1415 MHz from the dwarf M star AD Leonis with total durations of 50 s and 25 s. A sequence of quasi-periodic pulsations with a mean periodicity of 32 + or - 0.3 s and a total duration of 25 s was superposed on the 50 s burst

DESCRIPTORS: (U) *BURST TRANSMISSION, *MAGNETOHYDRODYNAMIC GENERATORS, *SPIKES, *DWARF STARS, *SOLAR FLARES, *RADIOFREQUENCY PULSES, *VARIABLE STARS, SOLAR CORONA, BINARY STARS, TRAPPING CHARGED PARTICLES, AREA COVERAGE, CYCLOTRON RESONANCE POLARIZATION, REPRINTS, CIRCULAR LOOPS, PUERTO RICO

IDENTIFIERS: (U) Millisecond Durations, LCP Left Circular Polarization, AD Leonis, RCP Right Circular Polarization, M Stars, Plasma Frequency, Binary Stars, Alven velocity, Coronal Loops, UV Ceti, Arecibo Observatory, YZ Canis Minoris, EQ Pegasi, YY Geminorum

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO EVN548

AD-A171 981   12. 1

STATE UNIV OF NEW YORK AT STONY BROOK DEPT OF APPLIED
MATHEMATICS AND STATISTICS

(U) Modules of Continuum Structures.

86   13p

PERSONAL AUTHORS: Baxter,Laurence A. ,Kim,Chul :

CONTRACT NO   AFOSR-84-0243

PROJECT NO   2304

TASK NO. A5

MONITOR   AFOSR
TR-86-0724

UNCLASSIFIED REPORT

ABSTRACT   (U)   A continuum structure function (CSF) is a
nondecreasing mapping from the unit hypercube to the unit
interval. Such a function, g say, is said to be weakly
coherent if sub g 1 sub i (g(01..x)0 for each component
i an element of C. Suppose that g is weakly coherent and
that x is nonempty. Then g all is a module of C g:
if g is weakly coherent, and if there exists a CSF k such
that g(x), k(jli:x superscript c)... x superscript A
superscript C for all x. A minimal path set of g is
essentially a subset of C which is necessary and
sufficient for the CSF to attain any value in its image
when every other component is in state zero. Using these
concepts, the main results of Birnbaum and Esary's theory
of modules of binary structure functions, in particular
the Three Modules Theorem, generalize to the continuum
case.

DESCRIPTORS   (U)   (MAPPING)(TRANSFORMATIONS), SET THEORY,
COHERENCE REPRINTS

IDENTIFIERS   (U)   CSF(Continuum Structure Function),
Structure functions, Hypercubes, PE61102F, WUAFOSP2304A,

AD-A171 981

AD-A171 982   CONTINUED

The scientific potential of these discoveries may be best
fulfilled by the construction of a solar dedicated
synthesis radiotelescope

DESCRIPTORS   (U)   (STARS)(SOLAR FLARES, CYCLOTRON
RESONANCE, COMPARISON, MASERS, EMISSION SPECTRA,
MICROWAVES, REPRINTS

IDENTIFIERS   (U)   Solar bursts, York, error arrays,

AD-A171 982

AD-A171 978

BATCH CONTROL NO: EVN548

AD-A171 978   7-3

CINCINNATI UNIV OH DEPT OF CHEMISTRY

(U) Reinforcing Effects, from Silica-Type Fillers Containing Hydrocarbon Groups.

85   6P

PERSONAL AUTHORS: Mark,J E. ;Sur,G S.

CONTRACT NO: AFOSR-83-0027

PROJECT NO: 2303

TASK NO: A3

MONITOR: AFOSR TR-86-0736

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Polymer Bulletin, v14 p325-329 1985

ABSTRACT: (U) Curing hydroxyl-terminated chains of poly(dimethylsiloxane) is achieved by reacting them with tetraethoxysilane, vinyltriethoxysilane, methyltriethoxysilane, and phenyltriethoxysilane, with excess amounts of the silanes hydrolyzed in-situ to filler particles. When triethoxysilanes are used, the vinyl, methyl, and phenyl groups must be part of the filler particles and, in at least some cases, the resulting reinforcement is better than that given by the silica particles obtained from the (unsubstituted) tetraethoxysilane

DESCRIPTORS: (U) *SILOXANES, *POLYMERS, *SILANES, HYDROLYSIS, METHYL RADICALS, ELASTOMERS, REPRINTS

IDENTIFIERS: (U) PE61102F WUAFPSR2303A3

AD-A171 978

AD-A171 980

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES DEPT OF HYDROCARBON RESEARCH INST

(U) Co2(CO)8 Catalyzed Reactions of Styrene Oxide with Trialkylsilanes.

85   2P

PERSONAL AUTHORS: Kang,Kyung Tae ;Weber,William P

CONTRACT NO: AFOSR 82-0333

PROJECT NO: 2303

TASK NO: B2

MONITOR: AFOSR TR-86-0739

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Tetrahedron Letters, v26 n44 p5415-5418 1985

ABSTRACT: (U) The dicobalt octacarbonyl catalyzed reaction of styrene oxide with trialkylsilanes yields a mixture of 1-phenyl-2-trialkylsiloxyethane and 2- and 1-phenyl-2-trialkylsiloxyethene The ratio of these products can be controlled

DESCRIPTORS: (U) *STYRENES, *SILANES, *OXIDES, COBALT COMPOUNDS, *CARBONYL COMPOUNDS, ALKYL RADICALS, SYNTHESIS, CHEMISTRY, CHEMICAL REACTIONS, CATALYSTS, REPRINTS

IDENTIFIERS: (U) Dicobalt Octacarbonyl, PE61102F

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A171 975   20/10   20/8

AD-A171 975   20/8

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) Ground States of Molecules. 67. MNDO Calculations for
Compounds Containing Iodine.

84   6P

PERSONAL AUTHORS: Dewar,Michael J. ;Healy,Eamonn F. ;
Stewart,James J.

CONTRACT NO: F49620-83-C-C024 AFOSR-79-0002

PROJECT NO: 2303

TASK NO: B2

MONITOR: AFOSR
TR-86-0725

UNCLASSIFIED REPORT

ABSTRACT: (U) Previous articles of this series have
described the MNDO model in detail and have reported
parameters for hydrogen, carbon, nitrogen, and oxygen,
for beryllium, for boron, for fluorine, for aluminum, for
silicon and phosphorus, for sulfur, for chlorine, and for
bromine. Here we describe the extension of MNDO to a
fifth period element, namely iodine, together with
results of calculations for a number of iodine containing
molecules. Since atomic orbit is (4d.) are not included
in the present version of MNDO, calculations for iodine
are limited to compounds of i. The parameters for iodine
were optimized, as usual, by a least squares fit to
various experimental properties of a basis set of
molecules. The properties included heats of formation,
geometries, ionization potentials, and dipole moments.

DESCRIPTORS: (U) *IODINE, *GROUND STATE, *QUANTUM THEORY,
COMPUTATIONS, MATHEMATICAL MODELS, MOLECULES, INTEGRALS,
LEAST SQUARES METHOD, FITTING FUNCTIONS, MATHEMATICS,
HEAT OF FORMATION, IONIZATION POTENTIALS, DIPOLE MOMENTS.

IDENTIFIERS: (U) MNDO(Modified Neglect of Differential
Overlap), PE61102F, WUAFOSR2303B2.

AD-A171 975

DTIC REPORT BIBLIOGRAPHY

AD-A171 975   7 3

UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES LOKER
HYDROCARBON RESEARCH INST

(U) Co 2 (Co 8) Catalyzed Reaction of Oxetanes with
Trialkylsilanes.

85   3P

PERSONAL AUTHORS: Kang Kyung-Tae ;Weber William P.

CONTRACT NO: AFOSR 82-0333

PROJECT NO: 2303

TASK NO: B2

MONITOR: AFOSR
TR-86-0718

UNCLASSIFIED REPORT

ABSTRACT: (U) Dicobalt octacarbonyl catalyzed silyl-
hydrocarboxylation of oxetanes can be controlled by the
choice of trialkylsilane. Triethylsilane gives 1,4 bis-
silyl ethers, while t-butyldimethylsilyl group yields silyl
enol ethers.

DESCRIPTORS: (U) *OXETANES, *CATALYSIS, *SILANES, *ALKYL
RADICALS, SILYL, *ENOLS, ORGANIC COMPOUNDS, *CATALYSTS, ETHERS,
BONDING.

IDENTIFIERS: (U) Hydrocarboxylation, Radical Enol,
Ethers, t-Butyldimethyl silyl group, PE61102F, WUAFOSR2303B2.

AD-A171 975

SEARCH CONTROL NO EVN54B

AD A171 973   7.4   7.5

TORONTO UNIV, ONTARIO, LASH MILLER CHEMICAL LABS

(U) Laser-Induced Addition of Hydrogen Fluoride to Unsaturated Molecules The HF + CH2CF(2) System.

84   9P

PERSONAL AUTHORS: Beck,Walter H. ;Burns,George ;

CONTRACT NO: AFOSR-84-0127

PROJECT NO: 2303

TASK NO: B1

MONITOR: AFOSR TR-86-0729

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Canadian Jnl. of Chemistry. v62 p2302-2309 1984

ABSTRACT: (U) Although certain classes of reactions are known to occur via 4-centre transition states, there has been no irrefutable proof that in the gas phase reactions also proceed via a 4-centre concerted process. Results of recent information theory calculations on the HF(v) + CH2CF2 system indicate that it should be possible to observe reaction products for HF(v = 5). Results are presented here on experiments attempting to achieve laser induced 4-centre addition of HF to several unsaturated molecules (C2H2, C2H4, C4H6, CH2CF2, and CF2CClF). A mixture of HF and co-reactant was irradiated by a dye-laser tuned photo-acoustically to the fifth vibrational level of HF, and the resulting mixture was analysed by gas chromatography and mass spectrometry. There was no evidence of any laser-induced products. An upper bound was deduced for the HF + CH2CF2 addition rate constant at 610 K.

DESCRIPTORS: (U) *ADDITION REACTIONS, *PHOTOCHEMICAL REACTIONS, *HYDROGEN FLUORIDE, *UNSATURATED HYDROCARBONS, *LASER APPLICATIONS, VINYL RADICALS, TRANSITIONS, MOLECULAR STATES, VAPOR PHASES, IRRADIATION, DYE LASERS, REACTION KINETICS, CONSTANTS, RELAXATION, REPRINTS

IDENTIFIERS: (U) Vinylidene Fluoride, PE61102F

AD A171 973

AD A171 974

PRINCETON UNIV, N DEPT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

(U) A Perturbation Approach to Improving Pisarenko Harmonic Retrieval.

OCT 84   11P

PERSONAL AUTHORS: Fuhrmann,Daniel R. ;Liu Bede ;

CONTRACT NO: AFOSR-81-0186

PROJECT NO: 2304

TASK NO: A6

MONITOR: AFOSR TR-86-0716

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Allerton Conference on Communication Control and Computers (22nd) p891-900 Oct 84

ABSTRACT: (U) One of the apparent drawbacks to eigenstructure based (Pisarenko) spectrum estimation is the tendency of the resultant eigen-polynomial to have extraneous roots on the unit circle when the autocorrelation matrix R is overdetermined. This problem can be dealt with successfully by a complete eigenvector decomposition of R, however, this method can be computationally expensive. Similar results can be obtained by simply subtracting a small perturbation from the (0,0) element of R prior to finding the minimum eigenvector.

DESCRIPTORS: (U) *MATRIX THEORY, EIGENVECTORS, PERTURBATIONS, COVARIANCE, SPECTRUM ANALYSIS, ESTIMATES, REPRINTS

IDENTIFIERS: (U) Harmonic Analysis, Pisarenko Method, Toepitz Matrices, Spectrum Estimation

AD A171 974

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVN54B

AD-A171 973   CONTINUED

WUAFOSR23038.1

AD-A171 964   7/3

CINCINNATI UNIV OH

(U) Elastomeric Networks Cross-Linked By Silica or Titania
    Fillers.

DESCRIPTIVE NOTE: Rept. for Nov 84-Nov 85.

    85   3P

PERSONAL AUTHORS: Sur,G. S. ;Mark,J. E. ;

CONTRACT NO   AFOSR-83-0027

PROJECT NO   2303

TASK NO   A3

MONITOR: AFOSR
             TR-86-0735

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in European Polymer Journal, v21
n12 p1051-1052 1985.

ABSTRACT: (U) Triethoxysilyl terminated
polydimethylsiloxane (PDMS) was prepared by reacting
triethoxysilane with vinyl terminated PDMS having a
number-average molecular weight of 11.3 x 1000g/mol
particles of silica and titania generated in situ by the
hydrolysis of tetraethoxysilane and titanium n-propoxide,
respectively, were found to end link this polymer. The
presence of a stable elastomeric network structure was
confirmed by stress-strain measurements in elongation

DESCRIPTORS: (U) *ELASTOMERS, *SILOXANES, *POLYMERS,
*SILANES, *TITANIUM OXIDES, *SILICON DIOXIDE,
SYNTHESIS CHEMISTRY, CROSSLINKING CHEMISTRY, HYDROLYSIS,
STRESS STRAIN RELATIONS, ELONGATION, REPRINTS

IDENTIFIERS   (U) END LINKING, PE61102F, WUAFOSP2303A3

AD-A171 964

AD-A171 973

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54R

AD-A171 962

AD A171 962   CONTINUED

(U) Temperature Dependence of the Reactions of Singlet and
Triplet Diphenylcarbene Evidence for Reversible Ylide
Formation in the Reaction with Alcohols

85   5p

UNCLASSIFIED REPORT

PERSONAL AUTHORS Turro,Nicholas J. ;Cha,Yuan ;Gould,Ian
R

CONTRACT NO   AFOSR-84-0040

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
TR 86-0733

SUPPLEMENTARY NOTE   Pub. in Tetrahedron Letters, v26 n48
p5951-5954 1985

monitors 1DPC and the isoprene reaction monitors 3DPC. In
figure 1 it is shown the effect of temperature on the
ration of the quantum yields for triplet (Q3) and singlet
(Q1) product information in several solvents In each
solvent triplet products are more favored at low and high
temperatures than at intermediate temperatures. In figure
2 are shown the results of similar experiments for CH3OD
and t-butanol.

DESCRIPTORS: (U) *CARBENES, *ALCOHOLS, CHEMICAL
REACTIONS, TEMPERATURE, PHENYL RADICALS, ISOPRENE,
REPRINTS

IDENTIFIERS: (U) *DIPHENYL CARBENE, CARRENE/DIPHENYL,
ISOOCTANE, PE61102F, WUAFOSR2303B2

ABSTRACT (U) The insertion of (phenyscarbene (DPC) into
the OH bonds of alcohols has received considerable
attention It is generally accepted that it is the
singlet state of DPC (1DPC) in equilibrium with the
ground triplet state (3DPC), that reacts with the
alcohols However the reaction mechanism is not yet
fully understood and recent kinetic data have been
viewed as inconsistent with the conventional mechanism
shown in Scheme I We now describe the effect of
temperature on the products of the reaction of DPC with
methanol and with isoprene in several solvents These
findings together with measurements of product isotope
effects provide additional insight into the carbene-
alcohol reaction and are consistent with an articulation
of the conventional mechanism. DPC yields benzhydryl
methyl ether upon reaction with methanol and two
isomeric cyclopropanes with isoprene At sufficiently low
concentrations of the carbene quenchers equilibrium
between 1DPC and 3DPC is more rapid than reaction At
sufficiently high concentrations isoprene efficiently
traps 3DPC but does not compete for 1DPC in the presence
of methanol which is a poor quencher of 3DPC but a very
efficient quencher of 1DPC The methanol reaction

AD A171 962

AD A171 962

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A171 960   6 20   AD-A171 960   CONTINUED

                                              WUAFOSR2312A5

WRIGHT STATE UNIV DAYTON OH SCHOOL OF MEDICINE

(U) Comparison of PFDA (Perfluoro-n-Decanoic Acid) and
    TCDD on Heart Membranes.

DESCRIPTIVE NOTE: Final rept. 1 May 82-14 Aug 85.

JUN 86   53P

PERSONAL AUTHORS: Langley, Albert E.

CONTRACT NO: AFOSR-82 0264

PROJECT NO: 2312

TASK NO   A5

MONITOR: AFOSR
         TR 86-0651

UNCLASSIFIED REPORT

ABSTRACT   (U)   Our initial observations of a reduced
responsiveness to adrenergic stimulation of hearts from
Perfluoro n decanoic acid (PFDA) treated rats has been
examined in terms of functional components of the
myocardial membrane. The reduced responsiveness can be
explained in part by a decrease in the number of cell
surface beta adrenergic receptors. An early and dramatic
fall in serum levels of thyroid hormones was observed.
Because much of the loss of adrenergic responsiveness can
be explained by the effects of PFDA on thyroid hormones
we concentrated our research on the anti thyroid actions
of PFDA. The most significant results of this research
was the observation reported in detail herein that
thyroxine supplementation could prevent the hypophagia
characteristic of PFDA treatment without effecting the
body wasting syndrome and hypothermia. The mechanism of
these paradoxical actions remains to be determined.

DESCRIPTORS   (U)   *CARBOXYLIC ACIDS, *DIOXINS, *TOXICITY,
*MEMBRANES, BIOLOGY), *HEART, MYOCARDIUM,
STIMULATION PHYSIOLOGY) NERVES, THYROID HORMONES, LOW
LEVEL, BODY TEMPERATURE, HYPOTHERMIA, ADENYL CYCLASE

IDENTIFIERS   Decanoic Acid Perfluoro n,
PFDA Perfluoro n Decanoic Acid, 2,3,7,8 TetraChlorodibenzo
p dioxin, Dioxin 2,3,7,8 Tetrachlorodibenzo p, PE611020

AD-A171 960

AD-A171 957   4/1

UTAH STATE UNIV LOGAN CENTER FOR ATMOSPHERIC AND SPACE
SCIENCES

(U) Effects of Different Convection Models upon the High-
Latitude Ionosphere.

PERSONAL AUTHORS: Rasmussen,C. E. ;Schunk,R. W. ;Sojka,J.
J.

86   19P

CONTRACT NO.   AFOSR-84-0029

PROJECT NO.   2310

TASK NO.   A2

MONITOR: AFOSR
TR-86-0670

UNCLASSIFIED REPORT

ABSTRACT: (U)   It is well known that convection electric
fields have an important effect on the ionosphere at high
latitudes and that a quantitative understanding of their
effect requires a knowledge of plasma convection over the
entire high latitude region. Two empirical models of
plasma convection that have been proposed for use in
studying the ionosphere are the Volland and Heelis models.
Both of these models provide a similar description of two
celled ionospheric convection, but they differ in several
ways, in particular, in the manner in which plasma flows
over the central polar cap and near the polar cap
boundary. Ot obtain a better understanding of the way in
which these two models affect the ionosphere, two
separate runs of our high latitude, time-dependent
ionospheric model were made, with only the convection
models distinguishing the two runs, it was found that the
two models were made, with only the convection models
distinguishing the two runs. It was found that the two
models lead to differences in the ionosphere but often
the differences are subtle and are swamped by universal
time effects. The most notable differences are in
predictions of the height of the F2 peak and in the ion
temperature, particularly along the evening polar cap
boundary and in the cusp region. For these two parameters,
the differences caused by the two different convection
models dominate the universal time effects. One question

AD-A171 957

AD-A171 958   4/1   9/3

CHICAGO UNIV IL JAMES FRANCK INST

(U) Dynamics of Gas Surface Interactions Instrumentation

DESCRIPTIVE NOTE   Final rept 1 Jan-31 Dec 85

MAR 86   19P

PERSONAL AUTHORS   Sibener,Steven J.

CONTRACT NO   AFOSR-85-0061

PROJECT NO   2303

TASK NO.   A2

MONITOR: AFOSR
TR-86-0669

UNCLASSIFIED REPORT

ABSTRACT: (U)   This instrumentation grant was used to
procure several pieces of equipment with significantly
enhanced research capabilities for studying the
interactions of molecular beams and laser radiation with
well defined surfaces in an ultra-high vacuum environment.
A partial listing of the topics that are being explored
in greater as a direct result of the new instrumentation
includes surface phonon spectroscopy, the dynamics and
energetics of heterogeneous interactions, thin film
growth including nucleation in two-dimensional systems,
gas surface energy transfer interaction potentials, and a
variety of laser surface processes such surface
photochemistry (radical reactions, desorption, ablation).
energy transfer, and photoemission.

DESCRIPTORS: (U)   *LABORATORY EQUIPMENT, *ELECTRON
SPECTROSCOPY ,INELASTIC SCATTERING. MOLECULAR BEAMS.
HIGH VOLTAGE, SPECTROMETERS. VACUUM APPARATUS. LASER
TARGET INTERACTIONS. PHONONS. THIN FILMS. ENERGY TRANSFER.
EXCIMERS. AUGER SPECTRON SPECTROSCOPY. ELECTRON OPTICS.
REFRIGERATION SYSTEMS. CLOSED CYCLE SYSTEMS. HELIUM

IDENTIFIERS: (U)   Electron spectrometers. Molecular
scattering. Photoemission spectra. PE61102F.
WUAFOSR2303A2

AD-A171 958

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A171 954   7/3   7/2

WISCONSIN UNIV-MADISON DEPT OF CHEMISTRY

(U) Metal Halide Catalyzed Rearrangements of Alkylcyclosilanes.

PERSONAL AUTHORS: Blinka,Thomas A. ;West,Robert ;

CONTRACT NO.   F49620-83-C-0044

PROJECT NO.   2303

TASK NO.   B2

MONITOR: AFOSR
TR-86-0588

UNCLASSIFIED REPORT

ABSTRACT: (U)   In the presence of an Al(Fe)Cl3 catalyst (AlFeCl6, the Al(Fe)Cl3 notation is being used because the exact nature of the catalyst is unknown), a series of permethylcyclosilanes (Me2Si)n n = 5-12, rearrange] to form isomeric branched cyclopentasilanes or cyclohexasilanes. For each permethylcyclosilane only one rearranged product was obtained. With the same catalyst, ethylundecamethylcyclohexasilane exhibited both skeletal rearrangement and alkyl group redistribution reactions. Perethylcyclosilanes, cyclopentamethylenecyclosilanes, and cyclotetramethylenecyclosilanes, and ethylmethylcyclosilanes either decomposed or did not react with the Al(Fe)Cl3 catalyst, depending upon the choice of solvent used in the reaction. A mechanism involving a cyclosilane Al(Fe)Cl3 complex is proposed to explain the observed rearrangement and redistribution reactions. The branching pattern and ring size of the rearranged permethylcyclosilanes are explained by sigma conjugation effects and steric interactions.

DESCRIPTORS: (U)   *SILANES, *CYCLIC COMPOUNDS, *ALKYL RADICALS, *CATALYSIS, ALUMINUM COMPOUNDS, IRON COMPOUNDS, CHLORIDES, CATALYSIS, METHYL RADICALS, ISOMERS, STEREOCHEMISTRY, REPRINTS

AD-A171 954

PAGE 249   EVN54-3

AD-A171 957   CONTINUED

that arises is whether one could examine measurements of plasma density and temperature and determine which of the two convection models most accurately represents actual ionospheric convection.

DESCRIPTORS: (U)   *CONVECTION,ATMOSPHERIC), *IONOSPHERIC MODELS, PLASMAS(PHYSICS), POLAR REGIONS, THERMOSPHERE, MAGNETIC FIELDS, STAGNATION POINT, F REGION, ELECTRON DENSITY, MAGNETOSPHERE, ELECTRIC FIELDS

IDENTIFIERS: (U)   Volland model, Heelis model, PE61102F, WUAFOSR2310A2

AD-A171-954   STARD: CONTROL NO: EVN546

IDENTIFIERS   (U)   WUAFOSR2303B2

AD-A171-954   20 5   20 5

IDENTIFIERS   (U)   Rader Engagement   PEG 11021   WUAFOSR2303B2

CALIFORNIA UNIV SANTA BARBARA QUANTUM INST

(U) Free Electron Lasers

DESCRIPTIVE NOTE: Final technical rept   15 Feb 84-29 Feb 85.

85   32P

PERSONAL AUTHORS: Colson,W. B.   Sessler,A. M. ;

CONTRACT NO: AFOSR-84-0079. DE-AC03-76SF-00098

PROJECT NO.   2301

TASK NO   A1

MONITOR: AFOSR
TR-86-0237

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in Annual Review of Nuclear and
Particle Sciences. v35 p25-54 1985.

ABSTRACT: (U)   This paper reviews the experimental and
theoretical development of free electron lasers. There is
a review of types of accelerators driving FEL, the
history of FELS, and the prospects for the future.

DESCRIPTORS: (U)   *FREE ELECTRON LASERS,
PUMPING(ELECTRONICS), ELECTRON ACCELERATORS, COMPTON
SCATTERING, COMPARISON, TRAVELING WAVE TUBES, LASER
AMPLIFIERS, REPRINTS

IDENTIFIERS: (U)   P26-102F, WUAFOSR2301A1

AD-A171-954

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A171 952   7/3   7/2   AD-A171 952   CONTINUED

CALIFORNIA UNIV RIVERSIDE DEPT OF CHEMISTRY

IDENTIFIERS: (U)   PE61102F, WUAFOSR2303B2

(U) Synthesis, Structure, and Electronic Properties of
(eta-C5Me5)2 V(Micron-OC)(V(CO)5. A Complex with a
Linear V-O-C-V Bond.

85   7p

PERSONAL AUTHORS: Osborne, Joseph H.: Rheingold, Arnold L...
Trogler, William C.

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
                TR-86-0727

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub in Jnl of the American Chemical
Society v107 n22 p6192-6297 1985

ABSTRACT   (U)   The reaction between V(CO)6 and (eta-C5Me5)
2V yields the mu-isocarbonyl complex (eta-C5M35)2V(mu-
OC)V(CO)5. Crystals of I belong to the space group C2/c.
An important aspect of the structure is the linear V-O-C
V moiety with V-O = 2.075 (4) A. C-O = 1.167 (6) A, and
C = 1.899 (5) A. Complex I is a paramagnetic. contains
two unpaired electrons, and obeys the Curie law between 5
and 294 K. SCC Xalpha DV calculations of (eta-C5H5)2V(mu-
OC)V(CO)5 show that nearly degenerate frontier orbitals
localize on the (eta-C5H5)2V+ fragment lead to a high-
spin 3B1 ground state. The V-O bond arises mainly from an
electrostatic interaction between (eta-C5Me5)2V+ and V(CO)
6. however, a small covalent Pi donor donation from a pi t
sub 2g orbital on V(CO)6 into a partly occupied t sub 1
Pi orbital on the (eta-C5H5)V+ fragment is observed.
Photolysis of I as well as its thermal reaction with
carbon monoxide in solution yields (eta-C5Me5)2V(CO)2V(CO)
6

DESCRIPTORS   (U)   *ORGANOMETALLIC COMPOUNDS, *CARBONYL
COMPOUNDS, *VANADIUM, *SYNTHESIS CHEMISTRY, *MOLECULAR
STRUCTURE, *ELECTRONIC STATES, CHEMICAL BONDS, CRYSTALS,
PARAMAGNETIC MATERIALS, GROUND STATE, ELECTROSTATICS.
ELECTRON ORBITALS, PHOTOLYSIS, THERMOCHEMISTRY.
ENERGETIC PROPERTIES, REPRINTS

AD-A171 952

AD-A171 952

SEARCH CONTROL NO. EVN54P

DESCRIPTORS: (U) *EXPERIMENTAL DESIGN, *LASER
APPLICATIONS, LIGHT PULSES PULSED LASERS
SHUTTERS(OPTICS), KERR MAGNETOOPTICAL EFFECT, SHORT
PULSES, LASER COMMUNICATIONS, DATA RATE, HIGH RATE, DATA
LINKS, TIME DOMAIN, TUNABLE LASERS, GRATINGS(SPECTRA),
PHOTOTHERMAL PROPERTIES, ACOUSTOOPTICS, CHARGE TRANSFER

IDENTIFIERS: (U) Picosecond Time, Femtosecond Time,
Frequency Domain, PE61102F, WUAFOSR2301A1

AD 172 940   (U)   BIBLIOGRAPHY

STANFORD UNIV   GINZTON LAB OF PHYSICS

(U) Laser Physics and Laser Techniques.

DESCRIPTIVE NOTE: Final rept. 1 Mar 84-28 Feb 86.

MAY 86   76p.

UNCLASSIFIED REPORT

PERSONAL AUTHORS: Siegman A. E.

CONTRACT NO   F49520-84-C-0041

PROJECT NO   2301

TASK NO   A1

MONITOR: AFOSR
TR 86-0723

ABSTRACT: (U)   This program develops new technologies for
exploiting the ultrafast data transmission and
measurement capabilities of lasers and applies these new
techniques to current scientific problems in physics,
chemistry, and ultrafast electronics. Several new
techniques are developed for making ultrafast
measurements with lasers, both using ultrashort light
pulses in combination with novel detection mechanisms to
make ultrafast measurements in the time domain, and also
using a novel tunable laser induced grating method for
making ultrafast measurements without pulses, working in
the frequency domain. Using the latter approach,
femtosecond resolution frequency domain lifetime
measurements are made on chemical systems, including the
important optical Kerr material CS. The first picosecond
pulse time domain measurements are demonstrated using
photoacoustic detection as a sensitive and flexible bulk
and surface detection mechanism in liquids and solids
flexible noncontracting method for making picosecond and
femtosecond measurements on a very wide variety of
surfaces A number of lifetime and damage studies are
made semiconductor surfaces and the formation of
spontaneous surface ripples or stimulated Wood s
anomalies are explored picosecond laser pulses. An
entirely new ultrafast photodetector concept is invented
based on ultrafast diffusion driven charge transport, its
experimental demonstration are being persued

AD-A171 949

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO   EVN54P

AD A171 944   3/1

FLORIDA UNIV GAINESVILLE SPACE ASTRONOMY LAB

(U) Interplanetary Dust and the Visible/Infrared Sky
    Background Radiation.

DESCRIPTIVE NOTE   Final rept 1 Apr 83-30 Sep 84.

JUL 86   21P

PERSONAL AUTHORS   Weinberg,Jerry L

CONTRACT NO   AFOSR-83-0107

PROJECT NO   2311

TASK NO   A1

MONITOR   AFOSR
           TR-86-0687

UNCLASSIFIED REPORT

ABSTRACT   (U)   A multidisciplinary approach is developed
to provide information on the optical and physical
properties of interplanetary dust, its location in space,
its origin and dynamics, and its contribution to the
astronomical background radiation in the infrared. This
approach makes use of ground-based, Earth orbital, and
deep space probe observations of zodiacal light,
development and use of inversion techniques to derive
information on particle properties and distribution from
zodiacal light observations, analysis of comet dust
observations, theoretical calculations and laboratory
measurements of scattering by spheroids, cylinders and
irregular particles, studies of interplanetary dust
dynamics.

AD A171 944

DTIC REPORT BIBLIOGRAPHY

AD A171 946   14 2   20 5

WISCONSIN UNIV-MADISON DEPT OF PHYSICS

(U) Experimental Research on Optogalvanic Effects

DESCRIPTIVE NOTE   Rept for 1 Aug 84 - 1 Jul 85.

JUN 86   5P

PERSONAL AUTHORS   Lawler J E

CONTRACT NO   AFOSR 84-0298

PROJECT NO   2301

TASK NO   A

MONITOR   AFOSR
           TR-86-0518

UNCLASSIFIED REPORT

ABSTRACT   (U)   Three pieces of capital equipment which
were acquired under this grant are briefly described. All
are being used in ongoing experimental research on
optogalvanic effects, changes in the conductance of a gas
discharge caused by illumination with radiation at a
wavelength corresponding to an atomic or molecular
transition. We are studying three aspects in order to
produce a more quantitative understanding of discharges
...... the energy quantum efficiency ...... that a
...... the voltage of the ....ections will
....ding to ...... on ...... controlled
.......a need to take on ....
....ed vo...... ....
....ssed spec...... ....
....re as high.. ....
....

Diagnostics and Robust Estimation when Transforming
the Regression Model and the Responses

DESCRIPTIVE NOTE: Technical rept. Aug 85-Aug 86

OCT 85   44P

PERSONAL AUTHORS: Carroll,R J ;Ruppert,David ;

REPORT NO: MMS-1592

CONTRACT NO: F49620-85-C-0144, NSF-DMS84-09602

PROJECT NO: 2403

TASK NO: A5

MONITOR: AFOSR
              TR-86-0E82

UNCLASSIFIED REPORT

ABSTRACT: (U)   In regression analysis, the response is
often transformed to remove heteroscedasticity and/or
skewness. When a model already exists for the
untransformed response, then it can be preserved by
transforming both the model and the response with the
same transformation. This methodology is called
transform both sides has been applied in several recent
papers, and appears highly useful in practice when a
parametric transformation family such as power
transformations is used, then the transformation can be
estimated by maximum likelihood. The MLE however is very
sensitive to outliers. This article proposes diagnostics
which indicate cases influential for the transformation
regression parameters. We also propose a robust bounded-
influence estimator similar to the Krasker-Welsch
regression estimate. Both diagnostics and the robust
estimator can be implemented on standard software.
(Author)

DESCRIPTORS: (U) *TRANSFORMA IONS(MATHEMATICS)
*ESTIMATES, REGRESSION ANALYSIS, MATHEMATICAL MODELS
RESPONSE, PARAMETERS, DIAGNOSIS(GENERAL), MAXIMUM
LIKELIHOOD ESTIMATION

AD A171 935

PERSONAL AUTHORS:

CONTRACT NO: AFOSR-85-0320, NSF-DMS83-18204

PROJECT NO: 2304

TASK NO: A5

MONITOR: AFOSR
               TR-86-0575

UNCLASSIFIED REPORT

ABSTRACT: (U)   Conditions are formulated which guarantee
the existence of positive solutions for simultaneous
systems of an open domain with each constant is a
positive measure. The main tools used are probabilistic
potential theory. Markov processes, and an iterative
scheme which is not a generalization of the one used for
quasi-monotone systems. Quasi-monotonicity is not assumed
and new results are obtained.

DESCRIPTORS: (U)   *MARKOV PROCESSES, *SIMULTANEOUS
EQUATIONS, POTENTIAL THEORY, DIFFERENTIAL EQUATIONS,
EILLIPSES, ITERATIONS, PROBABILITY, EIGENVALUES

IDENTIFIERS: (U)   ELLIPTIC DIFFERENTIAL EQUATIONS,
DIRICHLET PROBLEM, WUAFOSR2304A5, FE61102F

AD A171 934

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A171 937   21.2   7/3   7/4

CALIFORNIA UNIV LIVERMORE DEPT OF APPLIED SCIENCE

(U) Fundamental Study of Dense Fluid-Detonation

DESCRIPTIVE NOTE: Annual rept. 1 Apr 83-31 Mar 84.

MAR 84   10P

PERSONAL AUTHORS: Hoover William G ;

CONTRACT NO: F49620 81 C 0055; ARPA Order 40 7

PROJECT NO: 2306

TASK NO   B2

MONITOR: AFOSR
TR 86 0548

ABSTRACT   U   The atomistic pair distribution function
is determined for planar crystals undergoing both
uniaxial and hydrostatic compression. These distributions
are compared to the predictions of the Bassinen Peules
Jacobs model. Simulated bimolecular collisions of
triatomic and hexatomic planar molecules, with
oxyni trobenzene in mind, are used to model free
vibrations before and after   sion and
translation and deformation from gase to solid. bonded u
solid for m-nitrobenzene

AD A171 937

AD-A171 937   CONTINUED

CORNELL UNIV ITHACA NY SCHOOL OF APPLIED AND ENGINEERING PHYSICS

(U) Wavelength Independent Optical Lithography

DESCRIPTIVE NOTE: Annual rept 1 Sep 84-31 Aug 85.

JUN 86   81P

PERSONAL AUTHORS: Lewis,Aaron ;

CONTRACT NO.   AFOSR-84-0314

PROJECT NO.   2306

TASK NO   B2

MONITOR.   AFOSR
           TR-86-0558

UNCLASSIFIED REPORT

Availability: Document partially illegible

ABSTRACT: (U) (Near-Field Diffraction by a Slit:
Implications for Super-Resolution Microscopy).--The
transmission of light through an infinite slit in a thick
perfectly conducting screen is investigated. The spatial
distribution of the near-field energy flux is determined
through the formulation of four coupled integral
equations. which are solved numerically. Transmission
coefficients calculated by this method are in agreement
with those determined by an alternative formulation.
(Near-Field Scanning Optical Microscopy (NSOM).--A new
method for high resolution imaging. near field scanning
optical microscopy (NSOM). has been developed. The
concepts governing this method are discussed. and the
technical challenges encountered in constructing a
working NSOM instrument are described. Two distinct
methods are presented for the fabrication of well
characterized, highly reproducible. sub-wavelength
apertures. (Author)

DESCRIPTORS: (U) *LIGHT TRANSMISSION, *MICROSCOPY,
APERTURES. ENERGY. FLUX(RATE). DIFFRACTION. OPTICAL
SCANNING. OPTICAL IMAGES. HIGH RESOLUTION. FLUORESCENCE.
NEAR FIELD

AD-A171 935

(U) Fundamental Studies of Dense Fluid Rotor Wings

DESCRIPTIVE NOTE: Annual rept 1 Apr 84-31 Mar 85.

MAR 86

PERSONAL AUTHORS: Hoover.William G

CONTRACT NO. F49620-81-C-0050 ARPA Order 407?

PROJECT NO. 2306

TASK NO   B2

MONITOR   AFOSR
          TR-86-0591

UNCLASSIFIED REPORT

ABSTRACT: (U) Detonation wave profiles are obtained
using a realistic dense fluid equation of state These
profiles are compared to the predictions of the
simplified Zeldovich von Neumann Doering model. Methods
are developed for simulating the rapid uniaxial
compression of solids suited to molecular dynamics
simulation. the interatomic distribution function are
formulated for solids. for comparison with atomistic
simulations and use in kinetic reaction models. The next
two years will concentrate on reaction initiation and
intramolecular energy transfers in reacting molecules in
the solid phase.

DESCRIPTORS: (U) *DETONATION WAVES, *MATHEMATICAL MODELS.
*HIGH EXPLOSIVES. EXOTHERMIC REACTIONS. RELAXATION TIME.
VIBRATION. EQUATIONS OF STATE. CONTINUUM MECHANIC.
ENERGY TRANSFER SOLID PHASES. COMPUTERIZED SIMULATION

IDENTIFIERS: (U) Lennard Jones potential Zeldovich Von
Neumann Doering model Hugoniot curves WUAFOSR2306B2.
PE61102F

AD-A171 935

AD-A171 933   9/5   9/1   20/12

ILLINOIS UNIV AT URBANA COORDINATED SCIENCE LAB

(U) Modeling of GaAs/AlGaAs MODFET Inverters and Ring
     Oscillators.

JUL 85   5P

PERSONAL AUTHORS: Ketterson.A. ;Moloney.M. ;Morkoc.H. ;

CONTRACT NO: F49620-83-K-0021

PROJECT NO: 2305

TASK NO: C1

MONITOR: AFOSR
         TR 86 0536

                    UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub. in IEEE Electron Device Letters.
VEDL-6 n7 p359-362 Jul 85

ABSTRACT   (U)   Detailed understanding of the MODFET
inverter chains is lacking and present designs are based
on ground rules developed by trial and error. We
developed a simple and straightforward model for the
current voltage characteristics using results from
numerical solutions of the quantum mechanical problem.
this model agrees very well with experimental results
obtained in our laboratory. High frequency gate
capacitance voltage characteristics for a wide gate
voltage range was modeled for the first time in a similar
fashion. These models were used to simulate a chain of
inverters at 77 and 300 K for a wide range of supply
voltage and load current. The maximum device speed is
obtained for small supply voltages less than or equal to
1 V both at 300 and 77 K, where the effects of
transconductance degradation and large gate capacitance
are minimized. The devices exhibit under 10 ps switching
times, both at 300 and 77 K with 77 K logic swing being
much larger. The results are in qualitative agreement
with the reported experimental results. (Author)

DESCRIPTORS: (U)   *INVERTER CIRCUITS. *OSCILLATORS.
*FIELD EFFECT TRANSISTORS. *GALLIUM ARSENIDES. *ALUMINUM
GALLIUM ARSENIDE. MODELS. HETEROJUNCTIONS. DOPING.
SEMICONDUCTORS. LOW NOISE AMPLIFIERS. REPRINTS.

AD-A171 933

AD-A171 933   CONTINUED

IDENTIFIERS: (U)   Slits. *NSOM Near Field Scanning
Optical Microscopy, WUAFOSR2305B2. 2506I032I

AD A171 905   17 2

CONNECTICUT UNIV STORRS DEPT OF ELECTRICAL ENGINEERING
AND COMPUTER SCIENCE

(U) Stability Analysis of Interconnected Random Access
     Networks

DESCRIPTIVE NOTE: Interim technical rept 1 Jul 85-30 Jun
85

APR 86   46P

PERSONAL AUTHORS: Merakos,L. ;Georgiadis,L. ;Bisdikian,C.

REPORT NO. UCT/DEECS/TR-86-6

CONTRACT NO. AFOSR-83-0229. NSF-ECS85-06916

PROJECT NO. 2304

TASK NO. A5

MONITOR: AFOSR
          TR-86-0552

UNCLASSIFIED REPORT

ABSTRACT (U) This document considers the
interconnection of two multiple-access/broadcast networks.
each of which connects a large population of bursty users
via a packaet-switched. random-access channel. In each
network a station. called bridge node. receivers
internetwork packets from the local users and forwards
them to the bridge node of the destination network via a
point-to-point link. the bridge node of the destination
network places these internetwork packets in its queue
for subsequent broadcasting to the local users.
Considered are two ways of multiplexing the local traffic
and the internetwork traffic. contention multiplexing and
channel division multiplexing. Under contention
multiplexing. the bridge node uses the same random-access
channel that the local users use. and therefore it
participates in the contention. Under channel division
multiplexing. the channel in each of the two networks is
subdivided into a node subchannel. used exclusively by
the bridge node. and a random access channel. used by the
local users

AD A171 905

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO EVN54B

AD-A171 904   7/4   7/5

NORTHWESTERN UNIV EVANSTON IL DEPT OF CHEMISTRY

(U) The Spectroscopy and Reaction Kinetics of Transient Species.

DESCRIPTIVE NOTE: Final rept. 1 Jan-31 Dec 85.

JUN 86   9P

PERSONAL AUTHORS: Weitz,Eric .

CONTRACT NO   AFOSR-85-0099

PROJECT NO: 2917

TASK NO   A3

MONITOR: AFOSR
TR-86-0557

UNCLASSIFIED REPORT

Availability: Document partially illegible.

ABSTRACT: (U) A diode laser system has been acquired
through the DoD University Research Program. This diode
laser system will be employed in an apparatus which will
be used for studying transient gas phase species via IR
spectroscopy. The apparatus has a time response of 35
nsec and a sensitivity of 10 to the 10th power molecules/
cc. The apparatus is capable of providing information on
the structure rates of reaction and rates of relaxation
of transient species. It is currently being used to study
reactions of vinyl radicals and energy disposition in
CO's photoejected from metal carbonyl molecules.

DESCRIPTORS   (U)   *INFRARED SPECTROSCOPY, *REACTION
KINETICS, *VAPOR PHASES, *LASER APPLICATIONS, *PHASE
STUDIES, DIODES, TRANSIENTS, VINYL RADICALS, ENERGY
DEPOSITION, ORGANOMETALLIC COMPOUNDS, CARBONYL COMPOUNDS,
RELAXATION, RATES, PHOTOLYSIS, ABSORPTION SPECTRA

IDENTIFIERS   (U)   PE61102F, WUAFOSR2917A3

AD-A171 904

AD-A171 905   CONTINUED

DESCRIPTORS   (U)   *NETWORK ANALYSIS(management),
*MULTIPLE ACCESS, MULTIPLEXING, RANDOM ACCESS, COMPUTER
STORAGE, BURST TRANSMISSION, QUEUEING THEORY, STABILITY

IDENTIFIERS   (U)   Packet switching, Internetworks.
PE61102F, WUAFOSR2304A5

SEARCH CONTROL NO EVN54B

AD A171 900

AD A171 900   CONTINUED

STANFORD UNIV   A HIGH TEMPERATURE GASDYNAMICS LAB

(U) Advanced Diagnostics for Reacting Flows

DESCRIPTIVE NOTE   Annual scientific rept   1 Oct 84 30 Sep
85

OCT 85   63P

PERSONAL AUTHORS   Hanson, R. K.

CONTRACT NO   F49620 83 K 0004

PROJECT NO   2303

TASK NO   A3

MONITOR   AFOSR
TR 86 0633

UNCLASSIFIED REPORT

DESCRIPTORS   (U)   *PLASMA DIAGNOSTICS, *COMBUSTION, *FLOW
VISUALIZATION, LASER INDUCED FLUORESCENCE, MIE SCATTERING,
FLOW FIELDS, DIGITAL SYSTEMS, LASER APPLICATIONS, FLAME
SPRAYING, FIBER OPTICS, TUNABLE LASERS, INFRARED LASERS,
ULTRAVIOLET LASERS, VISIBLE SPECTRA, THERMAL PROPERTIES,
RADIATION ABSORPTION, MODULATION.

IDENTIFIERS   (U)   PE61102F, WUAFOSR2308A3

SUPPLEMENTARY NOTE   Original contains color plates: All
DTIC and NTIS reproductions will be in black and white.

ABSTRACT   (U)   Progress is reported for the past year of
an interdisciplinary program to innovate modern
diagnostic techniques applicable to combustion and plasma
flows Research topics include: (1) digital flowfield
imaging including temporally and spatially resolved
species and temperature imaging using planar laser
induced fluorescence (PLIF); (2) quantitative particle
imaging in spray flames using planar Mie scattering (PMS);
(3) quantitative velocity and pressure imaging using
variations of PLIF; (4) advanced solid state camera/
computer systems for high speed and high resolution
recording, processing and display of flow image data; (5)
fiber optic absorption/fluorescence sensors employing
tunable UV, visible and IR laser sources for species
measurements; (6) laser wavelength modulation
spectroscopy using rapid-scanning UV, visible and IR
laser sources for absorption and fluorescence
measurements of species, temperature and absorption
lineshapes; (7) plasma diagnostics utilizing laser
induced fluorescence and wavelength modulation techniques;
(8) laser interactions with plasmas and combustion gases;
and (9) investigation of other new diagnostic concepts.

AD A171 900

AD A171 900

UNCLASSIFIED

AD-A171 897   11/6   20/12   20/11   20/2

OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

(U) Strength and Structure of Ga1-xInx as Alloys.

DESCRIPTIVE NOTE: Quarterly rept. no. 2, 1 Jan-31 Mar 86.

APR 86   33P

PERSONAL AUTHORS: Faber, Katherine T.; Hirth, John P.;

CONTRACT NO.   F49620-85-C-0129. ARPA Order-5526

PROJECT NO   5526

TASK NO.   DO

MONITOR: AFOSR
            TR-86-0639

UNCLASSIFIED REPORT

ABSTRACT   (U)   The strengthening effect of GaAs by indium additions is under examination. Solid solution strengthening by InAs4 solute units has been predicted and is studied via mechanical measurements complemented by electron microscopy. In this second quarterly report, hardness measurements for three Ga1-xInxAs compositions from R T to 900 C are complete and the second stage of the experimental work, compression testing, as a function of temperature and strain rate is underway.

DESCRIPTORS: (U)   GALLIUM ALLOYS, INDIUM, ARSENIDES, STRENGTH(MECHANICS), MOLECULAR STRUCTURE, SOLID SOLUTIONS, HARDENING, HARDNESS, MEASUREMENT, WAFERS, DOPING, SINGLE CRYSTALS, YIELD STRENGTH, SHEAR STRESSES, THERMAL STRESSES, CRYSTAL GROWTH, HIGH TEMPERATURE, CZOCHRALSKI CRYSTALS, COMPRESSIVE PROPERTIES, TEST METHODS

IDENTIFIERS   (U)   PE61102F, WUAFOSR5526DO, LPN-OSURF-7649777717636

AD A171 897

AD A171 898   9 2

MICHIGAN UNIV ANN ARBOR SUPERCOMPUTER ALGORITHM RESEARCH LAB

(U) Block-Oriented Local Memory Linear Equation Solution on the CRAY-2. Part 1 Uniprocessor Algorithms

DESCRIPTIVE NOTE   Interim rept

DEC 85   32P

PERSONAL AUTHORS   Calahan, D A

REPORT NO   SARL 9

CONTRACT NO   AFOSR 84 0096

PROJECT NO   2304

TASK NO   A5

MONITOR   AFOSR
           TR 86 0681

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Presented at the SIAM Conference on Scientific Parallel Computing (2nd) Held at Norfolk, VA on 18 Nov 85.

ABSTRACT   (U)   Experience with the CRAY 2 on the effects of common memory speed and loading on performance indicate that local memory-based algorithms have potentially a large advantage. The performance of a number of common and local-memory algorithms are compared for the LU factorization of a dense systems of equations on the CRAY 2. Results of both Fortran and assembly language implementation are given.   Author

DESCRIPTORS   (U)   ALGORITHMS, COMPUTATIONS, LINEAR ALGEBRAIC EQUATIONS, SOLUTIONS(GENERAL), COMPUTER ARCHITECTURE, FORTRAN, ASSEMBLY LANGUAGES

IDENTIFIERS   (U)   CRAY 2 Computers, Uniprocessor Algorithms

AD A171 898

REPORT DOC   'APH'

AD A171 886   CONTINUED

ILLINOIS UNIV AT URBANA COORDINATED SCIENCE LAB

Molecular Beam Epitaxy Binding Energies. WUAFOSR23035C1.
PEG1102F

U   Low-Temperature Optical Absorption in Al Ga 1 As
Grown by Molecular Beam Epitaxy

SEP 85   8P

PERSONAL AUTHORS   Pearah P J   Masselink W T   Klem, J
Henderson T   Morkoc H

CONTRACT NO   F49620-83-K-0021

PROJECT NO   2305

TASK NO   C1

MONITOR   AFOSR
TR-86-0535

UNCLASSIFIED REPORT

ABSTRACT   U   A detailed study of optical absorption in
the Al   Ga 1 x As alloy system is undertaken using
optical transmission and photoluminescence data obtained
at 3 K from molecular-beam epitaxial layers. Absorption
coefficient spectra are calculated for the entire alloy
composition range 0 or x L or 1 The first
experimental data concerning AlAs in the region of the
Gamma sub 15   Gamma sub 1c band gap are presented. The
compositional dependence of threshold values of the
absorption coefficient agrees with current theoretical
predictions Detailed exciton structure is observed for
the first time in the absorption spectra of (Al(x)Ga(1-x)
As epilayers with x or 0 43   From this structure.
free exciton binding energies are determined These
energies display an x dependence qualitatively similar to
that observed in donor activation energies in n-type Al(x)
Ga(1-x)As

DESCRIPTORS   U   ALUMINUM GALLIUM ARSENIDE ALUMINUM
ARSENIDES OPTICAL PROPERTIES PHOTOLUMINESCENCE
ABSORPTION COEFFICIENTS ABSORPTION SPECTRA EXCITONS.
EPITAXIAL GROWTH MOLECULAR BEAMS CRYOGENICS REPRINTS

IDENTIFIERS   U   Excitonic Structure Optical Absorption.

AD A171 886

AD-A171 886

DTIC REPORT BIBLIOGRAPHY

AD-A171 884   11/6

VIRGINIA UNIV CHARLOTTESVILLE DEPT OF MATERIALS SCIENCE

(U) The Use of Novel Processing Procedures for Improving
    Overall Fatigue Resistance of High Strength Aluminum
    Alloys.

DESCRIPTIVE NOTE: Annual rept. 1 Jan-31 Dec 84.

MAY 84   61P

PERSONAL AUTHORS: Starke,Edgar A   , Jr.

REPORT NO.   UVA/525643/MS85/101

CONTRACT NO.   AFOSR-83-0061

PROJECT NO.   2306

TASK NO.   A1

MONITOR   AFOSR
          TR-86-0627

UNCLASSIFIED REPORT

ABSTRACT   (U)   Recent studies by the Air Force have shown
that 50% of all material failures in aircraft are a
result of fatigue (1) This high incidence of failures
prompted the new safe crack-growth approach for the
design of new aerospace structural systems However
accurate calculations require a knowledge of fatigue
crack growth behavior under a wide variety of load and
environmental conditions. Consequently, understanding the
mechanisms involved in the initiation and propagation of
fatigue cracks in metals is one of the key factors in
designing aircraft that are safe, efficient, and
economical Since fatigue crack initiation is a surface
phenomenon and fatigue crack propagation is a bulk
phenomenon, the fatigue properties may be optimized by
production processes that develop the desired
microstructures for FCI resistance on the surface and
the desired microstructure for FCP resistance throughout
the bulk. The objective of this program is to optimize
the microstructure of high strength aluminum alloys for
overall fatigue resistance, i.e., resistance to both FCI
and FCP, through the use of new primary processing
methods. Specifically, this research will identify those
microstructural features that control the different

AD-A171 885   20/5   7/4

OKLAHOMA UNIV NORMAN DEPT OF PHYSICS AND ASTRONOMY

(U) Laser Based Studies of Molecular Ion Dynamics in the
    Earth's Atmosphere

DESCRIPTIVE NOTE   Final rept 16 Jan 85-15 Jan 86

JUN 86   5P

PERSONAL AUTHORS   Miller Thomas M

CONTRACT NO   AFOSR-85-0128

PROJECT NO   2917

TASK NO   A2

MONITOR   AFOSR
          TR-86-0653

UNCLASSIFIED REPORT

ABSTRACT   (U)   This report lists the laser equipment
purchased which consists primarily of an argon ion laser
and a ring dye laser It describes how this equipment is
being set up in conjunction with a flowing afterflow
apparatus to study the photodissociation of positive and
negative molecular ions and the photodetachment of
negative ions Future uses of the equipment are outlined

DESCRIPTORS   (U)   LASERS, PHOTODISSOCIATION, MOLECULAR
IONS, AFTERGLOWS, ARGON LASERS, DYE LASERS

IDENTIFIERS   (U)   Photodetachment   WU=AFOSR2917A2
PE61102F

AD-A171 885

AD-A171 880   7 4   20 9   20 5

BEN-GURION UNIV OF THE NEGEV BEERSHEBA (ISRAEL) DEPT OF PHYSICS

(U) Optically Controlled Opening Switches.

DESCRIPTIVE NOTE: Final rept. 15 Aug 83-14 Aug 84.

AUG 84   22P

PERSONAL AUTHORS: Shuker,Reuben;

CONTRACT NO: AFOSR-84-0157

PROJECT NO: 2301

TASK NO: A7

MONITOR: AFOSR
TR-86-0686

UNCLASSIFIED REPORT

ABSTRACT: (U) Preliminary investigation of applying nonlinear optical effects in conjunction with the optogalvanic effect to achieve laser controlled opening switch was proposed in the low cost grant. It should be mentioned at the onset that this work was limited by the budget and that its purpose was mainly to define the problems and establish feasibilities. A crucial step is a match of mutual virtual level within the budget limitation, a few important steps were made: a) Detailed study of the plasma processes taking a major role in the opto-galvanic effect such as Penning ionization and direct electron impact inoization and their relative importance; b) the use of dye lasers according to the Raman scheme; c) Penning ionization in Hg/Ne and Sr/Ne(3) has been studied within the grant. A recent investigation the role of direct electron multistep ionization. The consequences are that although Penning ionization is an important process in the discharge it does not control it sustaining the discharge. In investigating the nonlinear effect little progress was made other than formalizing and defining the problems. (Author)

DESCRIPTORS: (U) *OPTICAL SWITCHING, *IONIZATION, *PLASMA GENERATORS, *QUENCHING, *LASER BEAMS, *PULSED LASERS, DYE LASERS, METAL VAPORS, DYE LASERS, MERCURY, ATOMIC ENERGY LEVELS, NEON, SWITCHES, STRONTIUM.

AD-A171 880

PAGE 264   EVN54B

UNCLASSIFIED

AD-A171 384

DESCRIPTORS: (U) *ALUMINUM ALLOYS, *CRACK PROPAGATION, HIGH STRENGTH, FATIGUE MECHANICS, GROWTH GENERAL, AIRCRAFT, RESISTANCE, MICROSTRUCTURE, ROUGHNESS, CRACKS, METALS

IDENTIFIERS: (U) 7475 ALUMINUM ALLOYS

OTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD A171 860   CONTINUED

AD A171 860   12/1

OPENING PROCESS: NITROGEN   PITTSBURGH UNIV PA CENTER FOR MULTIVARIATE ANALYSIS

IDENTIFIERS   U opening switches Nonlinear optics.
Optogalvanic effect Penning ionization Virtual states.
Metastable states Optical ground state Nitrogen lasers
Reabsorption PE611025 WUAFOSR230142

(U) Likelihood Principle and Maximum Likelihood Estimator
of Location Parameter for Cauchy Distribution.

DESCRIPTIVE NOTE. Technical rept.

MAY 86   20P

PERSONAL AUTHORS. Bai, Z. D. ;Fu, J. C. ;

REPORT NO. TR 86-13

CONTRACT NO. F49620-85-C-000

PROJECT NO. 2304

TASK NO. A5

MONITOR. AFOSR
TR 86-0602

UNCLASSIFIED REPORT

ABSTRACT   (U)   In the literature of point estimation.
Cauchy distribution with location parameters was often
cited as an example for the failure of maximum likelihood
method, and hence the failure of likelihood principle in
general Contrary to the above notion, we proved even in
this case that the likelihood equation has multiple roots.
that the maximum likelihood estimator the global maximum
remains as an asymptotically optimal estimator in the
Bahadur sense Author.

DESCRIPTORS   (U)   MAXIMUM   LIKELIHOOD ESTIMATION.
ASYMPTOTIC NORMALITY. INEQUALITIES, CAUCHY PROBLEM
RANDOM VARIABLES MULTIVARIATE ANALYSIS NORMAL DENSITY
FUNCTIONS

IDENTIFIERS   (U)   WUAFOSR2304A5 PE611025

AD A171 860

AD-A171 656   12 1

FLORIDA UNIV GAINESVILLE DEPT OF MATHEMATICS

(U) Constructing Markov Processes with Random Times of
Birth and Death

35P

DESCRIPTIVE NOTE: Technical rept

86   35P

PERSONAL AUTHORS: Getoor,R V ;Glover,Joseph ;

CONTRACT NO: AFOSR-85-0330, NSF-DMS84-19377

PROJECT NO: 2304

TASK NO: A5

MONITOR: AFOSR
TR-86-0678

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Sponsored in part by Grant NSF-DMS83-
18204.

ABSTRACT: (U) Given a time inhomogeneous Markov
transition semigroup $P(s/t) (x,dy)$ and an entrance rule m
= $(m$ sub t) satisfying m sub s $P(s/t) <$ or $= m$ sub t,
Kuznetsov constructed a measure o sub m on path space so
that the coordinate maps are Markovian with semigroup P
(s/t) and so that the process is born according to the
entrance rule m. Kuznetsov's approach was a Kolmogorov
type construction. The authors give a new approach based
on standard Markov process theory and a new analytic
proof of the decomposition of m as m sub $t = v$
infinity$(t) + $ integral from 0 to infinity of $(s/t) p(ds)$,
where p is a finite measure on R, and for each s, v
superscript $s = (vs/2)$ is an entrance law at s.

DESCRIPTORS: (U) (MARKOV PROCESSES,
(OPERATORS(MATHEMATICS), MEASURE THEORY, LIFE TESTS

IDENTIFIERS: (U) Existence theorems, Uniqueness theorems,
Birth and Death processes, Lebesgue measure, PE61102F,
WUAFOSR2304A5

AD A171 856

PAGE 266   EVN54P

CALIFORNIA UNIV LA JOLLA DEPT OF STATISTICS

(U) I.I.D. Representations for the Bivariate Product Limit
Estimators and the Bootstrap Version.

DESCRIPTIVE NOTE: Technical rept

SEP 85   25P

PERSONAL AUTHORS: Lo,Shaw-Hwa ;Wang,Jane Ling

REPORT NO: UCSD STATISTICS 69

CONTRACT NO: AFOSR 85 0268

PROJECT NO: 2304

TASK NO: A5

MONITOR: AFOSR
TR 85 0629

UNCLASSIFIED REPORT

ABSTRACT: (U) It is the purpose of this paper to further
investigate the path dependent bivariate (multivariate)
PL-estimator of (C&F (1982) (Horvath (1983)). For
simplicity, we shall focus on the bivariate case. The
multivariate case can be dealt with similarly. Two path-
dependent PL estimators are introduced in Section 2 of
(C&F (1982). We shall consider only one of them in this
paper as the other can be treated with symmetric argument
while this paper deals only with the multivariate random
censoring model. It is possible to extend the results to
the multivariate competing risk models.

DESCRIPTORS: (U) (BIVARIATE ANALYSIS, ESTIMATES, PATHS,
WEAK CONVERGENCE, MULTIVARIATE ANALYSIS, MATHEMATICAL
MODELS, RISK, CENSORSHIP

IDENTIFIERS: (U) (Product limit estimators, Bootstrap
method, Survival functions, WUAFOSR2304A5, PE61102F

AD A171 659

SERIAL REPORT BIBLIOGRAPHY

AD-A171 855

NEW YORK UNIV N Y

(U) The Perception of the Higher Order of Visual Motion

DESCRIPTIVE NOTE   Interim rept. no.   21 Oct 21 Dec 85

JUN 86   27P

PERSONAL AUTHORS   Kaufman Lloyd W   Hammeck Samuel J

CONTRACT NO   AFOSR-82-0050

PROJECT NO   2313

TASK NO   A5

MONITOR   AFOSR
TR 86 0514

UNCLASSIFIED REPORT

ABSTRACT   (U)   Document partially illegible.

ABSTRACT   This report describes theoretical work ...

SEARCH CONTROL NO. EVN54B

AD-A171 855   CONTINUED

DESCRIPTORS   (U) *VISUAL PERCEPTION, *COMPUTER OPERATORS,
THRESHOLDS (PHYSIOLOGY), DISPLAY SYSTEMS, MOTION,
PERFORMANCE (HUMAN), SINE WAVES, CATHODE RAY TUBE SCREENS

IDENTIFIERS   (U)   CSICK Computer Program

AD-A171 851   20 11   2

KOZIN BOGDANOFF AND ASSOCIATES INC

(U) B-Model Approach to Fatigue, Fatigue Crack Growth, and Wear for Durability Assessment.

DESCRIPTIVE NOTE: Final technical rept 1 Mar 82-28 Feb 85.

JUL 85   10P

PERSONAL AUTHORS: Bogdanoff, John L. ; Kozin, Frank .

CONTRACT NO. F49620-82-C-0036

PROJECT NO. 2303

TASK NO B2

MONITOR: AFOSR
TR-86-0661

UNCLASSIFIED REPORT

ABSTRACT: (U)   Based upon available data, a detailed statistical analysis has been made of the fatigue crack growth process. Much has been learned about this process including it's history dependence, and the class of acceptable cumulative distribution functions of the time for a crack to increase a specified amount. Two potential probabilistic models have been suggested and an initial investigation has been carried out. A methodology has been suggested for adaptive updating of a model of cumulative damage based upon service information to improve the accuracy of maintenance procedures to achieve a prescribed reliability. Based on the data, the effect of increase in length on the fatigue life was investigated. It was found that the weakest link idea was not applicable as a model and an acceptable model was proposed. (Author)

DESCRIPTORS: (U) *CRACK PROPAGATION, *FATIGUE LIFE, *STATISTICAL ANALYSIS, MATHEMATICAL MODELS, WEAR, MARKOV PROCESSES, PROBABILITY DISTRIBUTION FUNCTIONS

IDENTIFIERS: (U) B models, PE61102F, WUAFOSR2302B2

AD-A171 851

AD-A171 853

SOCIETY FOR INDUSTRIAL AND APPLIED MATHEMATICS PHILADELPHIA PA

(U) Symposium on Emerging Areas in Applied Mathematics. Held in Pittsburgh, Pennsylvania on 24-26 June 1985

DESCRIPTIVE NOTE: Final rept .

DEC 85   10P

PERSONAL AUTHORS: Bloch, I E .

CONTRACT NO. AFOSR 85-0122

PROJECT NO. 2304

TASK NO A2 A3

MONITOR: AFOSR
TR-86-0636

UNCLASSIFIED REPORT

ABSTRACT: (U)   This project approved the Symposium on Emerging Areas in Applied Mathematics held in conjunction with the SIAM 1985 Summer Meeting, June 24-26 in Pittsburgh, Pennsylvania. Eight invited speakers gave talks in four broad areas of applied mathematics: robotics, nonlinear partial differential equations and applications, scientific computing, and optimization. The meeting was very successful with a total attendance of more than 400 including representatives of 8 nations. (Author)

DESCRIPTORS: (U) *APPLIED MATHEMATICS, SYMPOSIA, ROBOTICS, NONLINEAR DIFFERENTIAL EQUATIONS, PARTIAL DIFFERENTIAL EQUATIONS, COMPUTATIONS, OPTIMIZATION

IDENTIFIERS: (U) WUAFOSR2304A3, WUAFOSR2304A2, PE61102F

AD-A171 853

SEARCH CONTROL NO EVN548

AD A171 836   7/4   7/5   7/3

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Picosecond Laser Studies of the Effects of Reactants
on Intramolecular Energy Relaxation of Diphenylcarbene
Reaction of Diphenylcarbene with Alcohols.

NOV 84   8P

PERSONAL AUTHORS   Sitzmann, E. V. , Langan, J. G. , Eisenthal,
K. B. ,

CONTRACT NO   N00014-84-G013

PROJECT NO   2363

TASK NO   01

MONITOR   ACOSR
TR-86-0073

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub. in Chemical Physics Letters,
v112 n2 p113 116   30 Nov. 84

ABSTRACT   (U) Picosecond laser induced fluorescence
measurements provide for the first time the direct
measurement of the intramolecular and intermolecular
energy decay dynamics of singlet diphenylcarbene (DPC).
In the presence of reactive molecules. As exemplified by
the reaction of 1DPC with alcohols it is found that
reactive molecules provide not only a chemical
decay channel but also an intramolecular decay channel
which is due to a solvent perturbation effect. These chemical
and physical effects can act in opposite directions,
leading to novel results such as a significant increase
in the singlet state lifetime upon addition of reacting
molecules. The absolute reaction rate constants of 1DPC
with alcohols in different solvents, obtained by direct
measurements are also reported.

ALASKA UNIV FAIRBANKS GEOPHYSICAL INST

Theoretical and Observational Studies of Gravity Wave
Excitation Propagation and Dissipation

DESCRIPTIVE NO.E Final rept. Apr 82-May 86.

MAY 86   23P

PERSONAL AUTHORS Fritts David C

CONTRACT NO   AFOSR-82-0125

PROJECT NO   2310

TASK NO   A1

MONITOR   AFOSR
TR-86-0583

UNCLASSIFIED REPORT

ABSTRACT   U   Research under this grant focussed on
several aspects of gravity wave excitation propagation
and dissipation that are expected to be important in the
atmosphere Initial studies addressed the excitation of
propagating waves by unstable shear layers and found that
the nonlinear interaction of evanescent unstable modes is
an efficient source of such motion Other numerical
studies examined the consequences of gravity wave
propagation and saturation in the middle atmosphere
Important findings include an amplitude limit imposed by
wave field instabilities the self-accelerations of large-
amplitude motions which may greatly expand the phase
speed distribution of mesospheric wave motions and the
field instability Observational studies revealed wave
field dynamics to be largely consistent with linear
instability theory with turbulence produces at that site
in the wave field where the motion is most unstable Wave
amplitudes were seen to be near saturation value and
easily described by a simple saturation model of the
evolving gravity wave spectrum throughout the atmosphere
Additional theoretical studies addressed the turbulent
transport of hear and constituents and the induced mean
vertical motions to vertically propagating gravity waves
contributing to our understanding of apparent differences
between observations and modeling results

AD-A171 834

PAGE   270   EVN548

SEARCH CONTROL NO EVN5AB

AD A171 833   12 1

NORTHWESTERN UNIV EVANSTON IL

... Random Circles, and Fields on Circles

DESCRIPTIVE NOTE. Technical rept.

MAY 86   47p

PERSONAL AUTHORS   Cinlar,Erhan Wang,J G

PROJECT NO   2304

TASK NO   05

MONITOR   AFOSR
           TR 86-0455

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Prepared in cooperation with
Princeton Univ, Dept of Civil Engineering

ABSTRACT   (U) The aim is to describe the exact shapes of
objects that were meant to be circles or cylinders The
shapes are modeled as random fields whose parameter
spaces are two intended shapes A specific random fields
on a true circle is introduced via exponential smoothing
of a random noise on the circle with stationary and
independent increments The result is a stationary
stochastically continuous random field When the noise is
taken to be the Gaussian random field on the circle A similar
construction for cylinders yields infinite dimensional
Ornstein-Uhlenbeck processes.

DESCRIPTORS   (U) *MATHEMATICAL ANALYSIS *CIRCLES
*MEASURE THEORY, CLEARANCES *PRECISION, SPHERES
CYLINDRICAL BODIES SHAPE   VARIATIONS, SEPARATION SET
THEORY MARKOV PROCESSES

IDENTIFIERS   (U) Ornstein-Uhlenbeck Processes Unv
Search, D PE61102 WUAFOSR2304A5

ABSTRACT: (U) In this paper we study the connectedness of 3 dimensional designs by reducing the dimension of designs from three to two. A new graphical method of determining the connectedness of designs is presented. The method is easier and simpler than the earlier known methods of Birkes, Dodge and Seely (1976) and Srivastava and Anderson (1970). A generalization of this method for 4 or higher dimensional designs is also discussed.

ABSTRACT: (U) According to a recent review, no single mechanism can adequately account for the rearrangement of azulene to naphthalene. Here we report a theoretical study, which has provided further insight into the solution of this long-standing mechanistic problem. The calculations were carried out using MNDO for closed-shell species and the spin unrestructed version of MNDO (UMNDO for biradical or open shell ones) as implemented in the MOPAC package of computer programs. All geometries were fully optimized, transition states (TS) located, and stationary points characterized by procedures included in MOPAC. The intramolecular mechanisms that have been suggested are outlined in schemes I and II. We first calculated the activation energy $E_{sub\ a}$ for the mechanism of scheme II ...

REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVN5.1B

AD A171 810   CONTINUED

Platteville radar Stratospheric

CONTROL DATA CORP MINNEAPOLIS MN METEOROLOGY RESEARCH CENTER

The Diurnal Variation of Backscatter and Doppler from VHF Doppler Radar Measurements in Colorado and Alaska

UNCLASSIFIED

DESCRIPTORS: ... METEOROLOGICAL RADAR DOPPLER RADAR ATMOSPHERIC REFRACTION BACKSCATTERING GRAVITY WAVES. ... AIR VERY HIGH FREQUENCY DIURNAL ... VARIATIONS MOISTURE REPRINTS ... ALASKA

AD A171 810

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVN54E

AD-A171 809   CONTINUED

AD-A171 809

IDENTIFIERS   (U)   Sulfate Sodium Dodecyl   PE61102F
WUAFOSR2303B2

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Magnetic Effects on Photoinduced Emulsion
Polymerization Effects of Lanthanide Ion Addition

86   6P

PERSONAL AUTHORS   Turro,Nicholas J. ;Arora,Kartar S. ;

CONTRACT NO   AFOSR-84-0040

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
TR-86-0738

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub. in Macromolecules, v19 n1 p42-46
1986

ABSTRACT   (U)   Photoinduced emulsion polymerization of
styrene with sodium dodecyl sulfate (SDS) as the
surfactant and dibenzyl ketone (DBK) as an initiator was
significantly prevented at 0 G in the presence of La(3+),
Gd(3+), or Mg(++). At 2000 G good yields of high
molecular weight polystyrene were obtained in the
presence of La(3+) or Mg(++) but polymerization was
significantly prevented in the presence of Gd(3+). These
results are explained on the basis of a combination of
salt effects on micellar structure and magnetic effects
on the reactions of geminate triplet radicals in micelles.
The presence of salts caused an increase in the size of
micelles, which in turn resulted in a reduced efficiency
of free-radical escape from the micelles, and the effect
of magnetic field on photoinduced emulsion polymerization
was counteracted by the presence of Gd(3+). The
polymerization of methyl methacrylate was found to be
unaffected by the addition of these ions in the absence
or presence of external magnetic field.

DESCRIPTORS   (U)   *POLYMERIZATION, *STYRENES,
*PHOTOCHEMICAL REACTIONS, *LANTHANUM, EMULSIONS, MAGNETIC
FIELDS, ADDITIVES, LANTHANUM COMPOUNDS, MAGNESIUM
COMPOUNDS, GADOLINIUM COMPOUNDS, CHLORIDES, SALTS

AD-A171 809

DTIC REPORT BIBLIOGRAPHY

SEARCH CONTROL NO. EVN54B

AD-A171 804   7/3   7/4

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) Potential Energy Surfaces and Tunnelling Dynamics of some Jahn-Teller Active Molecules.

85   8P

PERSONAL AUTHORS: Dewar,Michael J ;Merz,Kenneth M. ,Jr;

CONTRACT NO. F49620-83-C-0024, NSF-CHE82-17948

PROJECT NO. 2303

TASK NO B2

MONITOR AFOSR
TR-86-0612

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in Jnl. of Physical Chemistry. v89 n22 p4739-4744 1985

ABSTRACT (U) Potential energy surfaces and rates of tunnelling have been calculated for degenerate rearrangements of cyclopropane radical cation. cyclopropenyl radical, cyclopropenyl anion, and cyclooctatetraene, using MNDO or MNDO/HE/CI. Heavy atom tunnelling (HAT) plays an important role.

DESCRIPTORS: (U) *TUNNELING, RAT:S, CYCLOPROPANES, CYCLOOCTATETRAENE, ISOMERS, POTENTIAL ENERGY, SURFACES, *MOLECULAR ISOMERISM, CONVERSION, ORGANIC RADICALS, CATIONS, ANIONS, MOLECULAR ORBITALS, MOLECULAR VIBRATION, MOLECULAR STATES, REPRINTS

IDENTIFIERS (U) HAT Heavy Atom Tunneling, Jahn Teller effect. Cyclopropenyls Potential energy surfaces. Interconverting isomers. Bond switching. PE61102F WUAFOSR2303B2

AD A171 804   PAGE   275   EVN54B

AD A171 806   7 4

STATE UNIV OF NEW YORK AT BUFFALO DEPT OF CHEMISTRY

(U) Theory of Reactions at a Solid Surface.

85   33P

PERSONAL AUTHORS   George,Thomas F ;Lee,Kai-Tung ,Murphy William C ;Hutchinson,Michael ;Lee,Hai Woong

CONTRACT NO   AFOSR 82-0046, NSF-CHE80-23874

PROJECT NO   2303

TASK NO   B?

MONITOR   AFOSR
TR-86-0555

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE   Pub in Theory of Chemical Reaction Dynamics. v3 p139-164 1985

ABSTRACT (U) Theories and computational procedures are reviewed for processes involving bond breaking and formation at a solid surface. These processes include reactive scattering, recombination, adsorption and desorption. The article ends with a discussion of theoretical techniques for describing how some of the above processes are induced or modified by laser radiation

DESCRIPTORS (U) *CHEMICAL BONDS, REACTION KINETICS, ADSORPTION, DESORPTION, RECOMBINATION REACTIONS, LASER PUMPING, ELECTRON TRANSFER, QUANTUM THEORY, REPRINTS

IDENTIFIERS (U) Reactive Scattering, Langevin Equation Molecular Scattering, PE61102F WUAFOSR2303B3

AD A171 806

SEARCH CONTROL NO. EVN518

AD-A171 799 *2*

PRINCETON UNIV NJ DEPT OF ELECTRICAL ENGINEERING AND
COMPUTER SCIENCE

(U) Improving Resolution for Autoregressive Spectral
Estimation by Decimation.

JUN 83 9P

PERSONAL AUTHORS: Quirk,Maureen P. ;Liu,Bede ;

CONTRACT NO: AFOSR-81-0186

PROJECT NO: 2304

TASK NO: A6

MONITOR: AFOSR
TR-86-0644

UNCLASSIFIED REPORT

ABSTRACT: (U) This paper presents a method for
efficiently improving the resolution of autoregressive
spectral estimation algorithms. We derive the exact
autoregressive spectrum for K complex sinusoids in
additive white noise. From this equation resolution
boundaries are constructed which give the resolution in
terms of the model order ard other signal to noise ratio.
Simulation results are used to compare the resolution
boundaries for decimated and undecimated spectra. Our
results demonstrate that decimation by D with a model
order M yields the same resolution as a model order MD
used with the undecimated signal, and that decimation
reduces the computation.

DESCRIPTORS: (U) *SPECTRUM ANALYSIS. *REGRESSION
ANALYSIS. SIGNAL PROCESSING, WHITE NOISE, SIGNAL TO NOISE
RATIO. ALGORITHMS. POWER SPECTRA. REPRINTS

IDENTIFIERS: (U) Burg Algorithm Additive Noise.
PE61102F. WUAFOSR230446

AD-A171 799

(U) Dynamical Instabilities due to Gravity
Wave Motion in the Middle and Upper Atmosphere:
Theory and Observations.

DEC 83 *3*

PERSONAL AUTHORS: Fritts,David C. ;Rastogi,Prabhat K. ;

CONTRACT NO: AFOSR-82-0125 NSF-ATM83-13159

PROJECT NO: 2310

TASK NO: A1

MONITOR: AFOSR
TR-86-0671

UNCLASSIFIED REPORT

ABSTRACT: (U) Dynamical and convective instabilities are
two mechanisms that contribute significantly to the
dissipation of larger-scale motions and the generation of
turbulence in the middle atmosphere. The former are
normally due enhanced velocity shears and or a local
minimum of the static stability either in the mean flow
or associated with low-frequency wave motions. The most
common dynamical instability is the Kelvin-Helmholtz (KH)
instability which is often manifested in the atmosphere
as a series of KH billows. Convective instabilities occur
where the lapse rate becomes superadiabatic through the
action of gravity waves and appear to predominate for
high frequency wave motions. This paper reviews the
theory and the observational evidence for both types of
instabilities in the lower and middle atmosphere.

DESCRIPTORS: (U) *ATMOSPHERIC MOTION. *TURBULENCE.
MESOSPHERE. TROPOSPHERE. GRAVITY WAVES.
CONVECTION(ATMOSPHERIC). THERMAL INSTABILITY. PRANDTL
NUMBER. REPRINTS

IDENTIFIERS: (U) Kelvin Helmholtz In Stability).
Richardson Number. PE61102F. WUAFOSR2310A1

AD-A171 800

DTIC REPORT BIBLIOGRAPHY

Entry 1 (left):

AD A171 737   6 16

YALE UNIV NEW HAVEN CT DEPT OF OPHTHALMOLOGY AND VISUAL SCIENCE

(U) Two Dimensional Sampling by the Retinal Lattice

DESCRIPTIVE NOTE: Technical rept.

SEP 83   19P

PERSONAL AUTHORS: Hirsch,Joy ;Hylton,Ron .

REPORT NO: TR 8303

CONTRACT NO: N19620 83 C 0026

PROJECT NO: 2313

TASK NO: A5

MONITOR: AFOSR
          TR 86 0501

UNCLASSIFIED REPORT

Availability: Microfiche copies only. Document partially illegible.

ABSTRACT: (U)   A description of sampling in two dimensions and its implications for vision is presented. We show that aliasing in two dimensions will change both the apparent frequency and orientation of a grating. Further, in demonstrate that the Nyquist frequency depends on orientation and is higher than the usual estimate of 60 c g.

DESCRIPTORS: (U) *RETINA, *VISION, SAMPLING, TWO DIMENSIONAL, FREQUENCY, ORIENTATION, DIRECTION, GRATINGS, SPECTRA, CRYSTAL LATTICES, BRILLOUIN ZONES, PHOTORECEPTORS

IDENTIFIERS: (U) Aliasing, PE61102F, WUARDSP2313A5

AD A171 737

Entry 2 (right):

SEARCH CONTROL NO. EVN54B

AD-A171 786   7/3   7/2

IOWA UNIV IOWA CITY DEPT OF CHEMISTRY

(U) Preparation of F-Cadmium Reagents Directly from F-Alkyl Iodides and F-Aryl Bromide and Cadmium Metal.

PERSONAL AUTHORS: Heinze,Pamela L. ;Burton,Donald J. ;

PROJECT NO. 2302

TASK NO 32

MONITOR: AFOSR
          TR-86-0664

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: Pub in Jnl of Fluorine Chemistry.
v29 p356-261 1985.

ABSTRACT. (U)   F-alkyl cadmium reagents can be readily prepared via the direct reaction of F-alkyl iodides with cadmium powder in DMF at room temperature. Similar reaction of bromopentafluorobenzene with cadmium powder in DMF at room temperature affords the F-aryl cadmium reagent in excellent yield. This approach provides a rapid easily scaled up, one-pot procedure to these valuable synthetic reagents from commercially available precursors.

DESCRIPTORS. (U) *ORGANOMETALLIC COMPOUNDS, *FLUORINATED HYDROCARBONS, *CADMIUM COMPOUNDS, *SYNTHESIS,CHEMISTRY), ALKYL RADICALS, IODIDES, POWDERS, ARYL RADICALS, BROMIDES, ROOM TEMPERATURE, REPRINTS

IDENTIFIERS. (U) Cadmium Reagents, DMF (Dimethyl Formamide), Formamide/Dimethyl, PE61102F, WUAFOSR2303B2

AD A171 786

PENNSYLVANIA UNIV PHILADELPHIA

(U) Molecular Nonlinear Optics Nonlinear Optical
Processes in Organic and Polymer Systems

DESCRIPTIVE NOTE: 85   4P

PERSONAL AUTHORS: Garito,A F

CONTRACT NO.   AFOSR-84-0135

PROJECT NO.   2303

TASK NO.   A3

MONITOR: AFOSR
               TR-86-0607

UNCLASSIFIED REPORT

ABSTRACT: (U)   This review concerns the macroscopic
nonlinear optical responses of organic and polymeric
structures and the fundamental understanding of the
relations and origins of nonlinear processes to the
nature of electronic excitations and their interactions.
As natural developments in studies of nonlinear optical
phenomena, the recent demonstrations of phase conjugated
wave generation, optical bistable states and
exceptionally large nonlinear optical susceptibilities in
organic and polymeric materials have stimulated
considerable growth in research and development
activities in centers throughout the world. These
intriguing phenomena suggest a wide variety of potential
applications in future optical telecommunications, image
reconstruction, integrated optics, optical signal
switching and processing, data storage, and optical
memory and logic technologies. We believe the recent
advances in nonlinear optical research can be rapidly
accelerated and enlarged through fundamental studies of
organic and polymer crystals and films.

DESCRIPTORS: (U)   *ORGANIC MATERIALS, *POLYMERS, *OPTICS,
MOLECULAR STRUCTURE, OPTICAL PROPERTIES, ELECTRONIC
STATES, EXCITATION, INTERACTIONS, CRYSTALS, FILMS

ENGINEERIN

(U) A Result on Data Compression for Image Processing

DESCRIPTIVE NOTE: Sept. for 1 Oct 80 - 30 Sep 85

MAR 85

PERSONAL AUTHORS: Griswold,N C ,Halverson,D R ,Wise

CONTRACT NO   AFOSR 81 0047

PROJECT NO   2304

TASK NO   A5

MONITOR   AFOSR
              TR 86 0523

UNCLASSIFIED REPORT

ABSTRACT   (U)   This document presents an easily
implemented alternative scheme for image compression
which allows exploiting some commonly encountered image
characteristics. This approach admits the possibility of
improved performance and enhanced compression ratios when
compared to block truncation coding. The application of
the algorithm is illustrated by various example images,
and it is seen that the results also have the surprising
consequence that the algorithm can restore certain images
with no alteration whatsoever and yet still achieve
reasonable compression ratios. (Author)

DESCRIPTORS   (U)   *DATA COMPRESSION, *IMAGE RESTORATION,
IMAGE PROCESSING, ALGORITHMS, TRUNCATION, REPRINTS

IDENTIFIERS   (U)   PE61102F WUAFOSR2304A5

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A171 784   CONTINUED

ACETYLENES. MONOMERS. VINYL PLASTICS. LIQUID CRYSTALS.
REPRINTS

IDENTIFIERS: U   PE61102F, WUAFOSR2303A2

AD-A171 783   7/3   7/2

ULTRASYSTEMS INC IRVINE CA

(U) Reactions of Perfluoronitriles II Interactions with
    Phenylphosphine.

    85   19P

PERSONAL AUTHORS: Paciorek,K. J. ;Nakahara,J. H. ;Kratzer,
    R. H.

CONTRACT NO.   F49620-82-C-0021

PROJECT NO: 2303

TASK NO   B2

MONITOR   AFOSR
    TR-85-0616

    UNCLASSIFIED REPORT

ABSTRACT   (U)   Treatment of perfluoro-n-octanonitrile
with phenylphosphine gave tetraphenyltetraphosphine and a
spectrum of reduction and interaction products. Fifteen
compounds were identified The imine, (Rf-C7F15) RfCH=NH,
and the amine, RfCH2NH2 were the primary reduction
products. Secondary phosphorus, free products, some formed
following ammonia evolution, were the following
RfCH=NCH2Rf. RfCH2CH(NH2)Rf. R=C(=NH)NCRf=NH2).
RfCH2NHCRf=NH. (RfCN)3. RfCH-NCRf=NCRf=NH.
RfCH2N=CRf=NHCH2Rf. and RfCH2N=CRfNHCRf=NH. Only three
phosphorus-containing materials were definitely
identified. RfCH.NH2(P-C6H5).., RfCH(P-C6H5)H:N=CHRf, and
RfC(=NH-P-C6H5(CRf=NH). Depending on reaction conditions.
specific phosphorus-containing compounds could be
preferentially produced All the structure assignments
are based solely on mass spectral breakdown patterns
since pure compounds were not isolated

DESCRIPTORS: (U)   *NITRILES. *FLUORINE COMPOUNDS.
*PHOSPHINE. *PHENYL RADICALS. *CHEMICAL REACTIONS.
CHEMICAL DERIVATIVES. IMINES. AMINES. PHOSPHORUS.
ADDITION REACTIONS. SOLVENTS. MOLECULAR STRUCTURE. MASS
SPECTRA. REPRINTS

AD-A171 783

ALASKA UNIV FAIRBANKS GEOPHYSICAL INST

Comparison of Mesospheric Wind Spectra with a Gravity
Wave Model

DEC 85   9P

PERSONAL AUTHORS   Smith,Steve A. ;Fritts,David C
VanZandt,Thomas E

CONTRACT NO   AFOSR 82-0125

PROJECT NO   2310

TASK NO   A1

MONITOR   AFOSR
TR-86-0665

UNCLASSIFIED REPORT

ABSTRACT   (U) Radial wave number spectra are presented
for wind fluctuations obtained from heights near the
mesopause by the Poker Flat Alaska mesosphere-
stratosphere-troposphere (MST) radar running in a high
spatial resolution mode (300 m). The spectra are of
radial wind fluctuations along one vertical and two
oblique (15 deg. zenith angle) beams measured at heights
of 82-88 km during summer. The oblique wave number
spectra have amplitudes that are within a factor of 3 of
each other and appear to follow power laws with exponents
in the -2 to -2.8 range. In order to infer what portion
of the spectral amplitude can be attributed to gravity
waves, the ratio of oblique to vertical amplitudes is
compared with the ratio predicted by the gravity wave
model of VanZandt. The observations are found to be
consistent with model suggesting that gravity waves are
the dominant motion in the high latitude summer
mesosphere.

DESCRIPTORS   (U) *WIND VELOCITY *MESOSPHERE *GRAVITY
WAVES, ARCTIC REGIONS SUMMER SPECTRUM ANALYSIS RADAR
SIGNALS REPRINTS

AD A171 8

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54E

AD A171 755   7/4

SRI INTERNATIONAL MENLO PARK CA CHEMICAL KINETICS DEPT

(U) Reaction of CF3 Radicals on Fused Silica Between 320
and 530 K.

FEB 86   9P

PERSONAL AUTHORS: Selamoglu N ;Rossi,M J ;Golden,D M.

CONTRACT NO   F49620-85-K-0001

PROJECT NO   2303

TASK NO   B1

MONITOR   AFOSR
TR-86-0609

SUPPLEMENTARY NOTE: Pub. in Jnl. of Chemical Physics, v84
n4 p2400-2407, 15 Feb 86

ABSTRACT   (U) The reaction between CF3 radicals and
silicon oxide (fused silica) surface was studied in a
Very Low Pressure Photolysis flow reactor (approx. 0.1-3
mTorr) as functions of surface temperature (320-530 K)
and CF3 concentration. The CF3 radicals were generated
from CF3I by CO2 laser photolysis, and the subsequent gas
phase reaction products were followed by mass
spectroscopy. The surface reaction was found to yield CO,
HF, CO2, COF2, and SiF4. It was found that H2O residing
on the silicon oxide surface was largely responsible for
the oxygen and hydrogen containing products, and that
little etching of the SiO2 itself occurred under these
conditions. The rates for the irreversible surface loss
of CF3 and for the formation of CO were both first order
with respect to CF3. These were found to be temperature
dependent with E sub a approx. 4.7 and 2.5 kcal/mol
respectively. The CF3 surface loss rate indicates that
the sticking coefficient for this radical on quartz is
between 0.0014-0.017 for the temperature range of this
study.

DESCRIPTORS   (U) *FLUORINATED HYDROCARBONS, *SURFACE
CHEMISTRY, *FUSED SILICA, SURFACE TEMPERATURE,
REACTIVITIES, MASS SPECTROSCOPY, FREE RADICALS, REACTION

AD A171 755

PAGE   281   EVN54E

PRINCETON UNIV. NJ DEPT OF ELECTRICAL ENGINEERING AND
COMPUTER SCIENCE

An Iterative Algorithm for Locating the Minimal
Eigenvector of a Symmetric Matrix

6p

PERSONAL AUTHORS   Fuhrmann Daniel R , Liu Bede ;

CONTRACT NO   AFOSR 81 0188

PROJECT NO   2304

TASK NO   A6

MONITOR   AFOSR
TR 86 0642

UNCLASSIFIED REPORT

ABSTRACT: (U) A new iterative method of finding the
minimum eigenvalue of a symmetric matrix is described
This method does not utilize matrix inversions and is
applicable to any matrix R for which the matrix vector
product Rx is rapidly computable It seeks the minimum
eigenvalue of R by minimizing the quadratic form
x'transpose Rx on the unit hypersphere, using a search
technique derived from the conjugate gradient method The
computational complexity of each step of the algorithm
depends on the speed with which Rx can be computed

DESCRIPTORS: (U)   *MATRICES MATHEMATICS: *EIGENVALUES.
ITERATIONS SOLUTIONS GENERAL   SYMMETRY   REPRINTS

IDENTIFIERS   (U)   Conjugate gradient method   PE61102F,
WUAFOSP2304A6

AD A177 143

PAGE 282   EVN548

SUBJECT CONTROL NO EVN54P

REF U. BIBLIOGRAPHY

AD A174 746   CONTINUED

LEAST SQUARES METHOD EXTRAPOLATION DISCRETE
DISTRIBUTION PERRINS

IDENTIFIERS   (U)   SVD-Singular Value Decomposition;
Inverse problems; Moore Penrose Inverse matrix

Reactions of Perfluoro... ... Interactions with
Aniline

45   10P

PERSONAL AUTHORS   Pactoret   Nakahara   Kratzer
R H

CONTRACT NO   F49620 82 C 0021

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
TR 86 0615

UNCLASSIFIED REPORT

ABSTRACT   U   Perfluoro-n octanonitrile was found to
react with aniline both in the absence and presence of
solvents A spectrum of products was formed including
tris perfluoro-n-heptyl s triazine, N phenyl perfluoro
n octylamidine as well as the diphenyl analogues of the
last two compounds The reaction mechanisms infrared and
mass spectra are discussed

DESCRIPTORS   U   NITRILES, FLUORINE COMPOUNDS,
ANILINES, CHEMICAL REACTIONS SOLVENTS AMIDINES
PHENYL RADICALS ANALOGS INFRARED SPECTRA MASS
SPECTROMETRY GAS CHROMATOGRAPHY REPRINTS

IDENTIFIERS   U   Perfluoronitriles PE611011
WUAFOSR2303B2

AD A...

SEARCH CONTROL NO E8N53B

AD A1?1 ?90   0 ?   10 1

PRINCETON UNIV, NJ DEPT OF ELECTRICAL ENGINEERING AND
COMPUTER SCIENCE

On the Use of Singular Value Decomposition and
Decimation in Discrete Time Band Limited Signal
Extrapolation

DEC 84   13P

PERSONAL AUTHORS: Sullivan, Barry J   Lu Ende

CONTRACT NO N00014 81 0100

PROJECT NO 2301

TASK NO   A6

MON TOR   AFOSR
          TR 85 0643

SUPPLEMENTARY NOTE   Pub in IEEE Transactions on
Acoustics Speech and Signal Processing   ASSP 32 n6
p1201 1, 2 Dec 84

ABSTRACT   The problem of interpolating a band
limited signal from its samples is considered. The use of
singular value decomposition in this problem is
investigated. The approximation of the signal is
investigated in terms of SVD solutions
obtained ...

(U) Photoelectron Spectrum of Benzyne

85   4P

PERSONAL AUTHORS: Dewar Michael J. ,Tien Tze Pei .

CONTRACT NO: F49620-83-C-0024

PROJECT NO: 2303

TASK NO: B2

MONITOR: AFOSR
TR-86-0611

UNCLASSIFIED REPORT

ABSTRACT: (U) The u.v. photoelectron (UPE) spectrum of
benzyne prepared by flash vacuum thermolysis of phthalic
anhydride or indantrione is reported. bands
corresponding to benzyne were not observed in the UPE
spectra of the products from pyrolysis of iodobenzene, o-
di-iodobenzene or benzoyl bromide

DESCRIPTORS: (U) *UNSATURATED HYDROCARBONS, *CYCLIC
COMPOUNDS, *PHOTOELECTRON SPECTRA, *ULTRAVIOLET SPECTRA,
THERMOCHEMISTRY, PYROLYSIS, PHTHALATES, ANHYDRIDES.
REPRINTS

IDENTIFIERS: (U) *Benzyne, Indantrione WUAFOSR2303B2,
PE611025

D T C REPORT BIBLIOGRAPHY

SEARCH CONTROL NO EVN54B

AD-A171 711   7/3   7/2

IOWA UNIV IOWA CITY DEPT OF CHEMISTRY

U: A Remarkably Simple Preparation of (Trifluoromethyl)
Cadmium and -Zinc Reagents Directly from
Difluorodihalomethanes

PERSONAL AUTHORS   Burton, Donald J ; Wiemers, Denise M ,

CONTRACT NO   AFOSR-85-0009 NSF CHE85-40779

PROJECT NO   2303

TASK NO   R2

MONITOR   AFOSR
           TR-86-0660

ABSTRACT   Reaction of difluorodihalomethanes with
acid-static cadmium or zinc powders in dimethyl acetamide
gives the trifluoromethyl cadmium or zinc reagents in high
yield in a mechanism in this conversion of the
difluorodihalomethane group into the trifluoromethyl group is
proposed. Reaction of the trifluoromethyl zinc reagent which
in formed in 100 capacity to give the trifluoromethyl cadmium
reagent which in turn is a mild, but efficient ... which
generated trifluoromethide anion. The trifluoromethyl metal
reagents ... mild methods ... are stable ... and can be
prepared in high yield from ... This simple and readily
available reagents for ... reactions.

DESCRIPTORS: (U) SYNTHESIS CHEMISTRY , (U) ORGANOMETALLIC
COMPOUNDS , ZINC COMPOUNDS , FLUORINATED HYDROCARBONS ,
(U) RADICALS , HALOGINATED HYDROCARBONS, METHANE ,
ZINC , METALS , FORMAMIDES , METHYLATION , REAGENTS

IDENTIFIERS: (U)   WUAFOSR2303R2

TEXAS UNIV AT AUSTIN DEPT OF CHEMISTRY

(U) Stannylenes: An MNDO Investigation

PERSONAL AUTHORS   Dewar,Michael J ; Friedheim,James E ;
Grady,Gilbert L

CONTRACT NO   F49620-83-C-0024

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
TR 86-0610

UNCLASSIFIED REPORT

ABSTRACT   (U)   While the chemistry of carbon II
compounds (carbenes) has been extensive y studied
references to the organic chemistry of tin II compounds
stannylenes remain sparse While the stable tin II
halides have been well characterized and MNDO studies of
them reported organotin II compounds have remained
elusive and most of the early claims for their
preparation have been refuted In recent years however
clear evidence for the preparation and reactions of
stannylenes has emerged The reactions so far reported
include insertion into carbon halogen or tin-halogen
bonds polymerization and cheletropic cycloadditions As
in the case of divalent carbon the reactions may take
place either via free stannylenes or through stannylenoid
intermediates We have now examined several such
processes using the MNDO SCF MO model MNDO parameters
for tin have recently become available and extensive
studies of tin compounds have led to satisfactory results

DESCRIPTORS   (U)   *ORGANOMETALLIC COMPOUNDS , *TIN
COMPOUNDS , *SYNTHESIS/CHEMISTRY , QUANTUM CHEMISTRY
COMPUTATIONS, ADDITION REACTIONS, CHEMICAL BONDS
POLYMERIZATION METHYL RADICALS REPRINTS

IDENTIFIERS   (U)   MNDO Modified Neglect of Differential
AD-A171 799

PAGE   288   EKN54B

AD A171 708   7/5

COLUMBIA UNIV NEW YORK DEPT OF CHEMISTRY

(U) Picosecond Dynamics of Barrier Crossing in Solution: A
    Study of the Conformational Change of Excited State 1,
    1'-Binaphthyl.

NO/ 85   10P

PERSONAL AUTHORS: Eisenthal, Kenneth B.   Millar, David P.

CONTRACT NO   AFOSR 84-0013

PROJECT NO   2303

TASK NO   B2

MONITOR   AFOSR
           TR 25 0672

UNCLASSIFIED REPORT

ABSTRACT: (U)   The rates of light-induced conformational
changes ... excited state 1,1'-binaphthyl in a series of
liquid solvents and solutions by a picosecond laser
technique. Excellent agreement with experiment is found
...

(U) Nonlinear Optical Processes in Organic Media Large
Non Resonant Third Order Electronic Responses in High
Performance Liquid Crystal Polymer Structures

JAN 86   8P

PERSONAL AUTHORS   Garito A F ; Teng C C

CONTRACT NO   F49620 84 C 0110   AFOSR-84-0135

PROJECT NO   2303

TASK NO   A3

MONITOR   AFOSR
TR-86-0608

UNCLASSIFIED REPORT

ABSTRACT   (U) Organic and polymer structures exhibit
unusually large ultrafast second and third order
nonlinear optical properties in a large number of
structures, phases, and states. Rapid advances in the
field can be achieved through further development of
stable, high performance polymer structures having
outstanding secondary properties as demonstrated for
example by high performance liquid crystal polymers. For
two such polymer systems, PBI and PBT, third harmonic
generation measurements show that they possess large
nonresonant third order optical susceptibilities whose
origin resides in ultrafast, lossless excitations of
highly charge correlated electron states

DESCRIPTORS   (U) *POLYMERS *LIQUID CRYSTALS
*ELECTRONIC STATES, *OPTICS OPTICAL PROPERTIES
NONLINEAR SYSTEMS, EXCITATION HARMONICS NEODYMIUM
LASERS YAG LASERS POLYBENZIMIDAZOLE OPTICAL EQUIPMENT

IDENTIFIERS   (U) Polybenzobisthiazole PE611025
WUAFOSR2302A3

AD A171 700

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN546

AD-A171 695   4

AD A171 695   CONTINUED

ALASKA UNIV. FAIRBANKS. GEOPHYSICAL INST.

(U) A Numerical Study of Gravity Wave Saturation.
Nonlinearity and Multiple Wave Effects.

OCT 85   16P

PERSONAL AUTHORS: Fritts David C.

CONTRACT NO. AFOSR 82 0125

PROJECT NO. 2310

TASK NO. A1

MONITOR: AFOSR
         TR 86 0950

UNCLASSIFIED REPORT

ANALYSIS. TURBULENT DIFFUSION. SHEAR STRESSES. REYNOLDS
NUMBER NUMERICAL ANALYSIS. PERTURBATIONS. REPRINTS

IDENTIFIERS: (U) Reynolds Stress, Boussinesq
Approximation PE61102F. WUAOSR2310A1

SUPPLEMENTARY NOTE:

ABSTRACT:

ABSTRACT: (U)   Reaction of perfluoro-n-octanonitrile with
diphenylphosphine gave two products, a primary adduct
C7F15C=NH-P-C6H5)2 and the reduced adduct. C7F15CH-NH2-
P-C6H5-2 Presence of water prevented the formation of
the reduced compound, the latter was not produced by
reduction of the primary adduct. Operative mechanisms are
postulated. infrared and mass spectra are discussed

DESCRIPTORS: (U) NITRILES, PHOSPHINE, FLUORINE
COMPOUNDS, CHEMICAL REACTIONS, INFRARED SPECTRA, MASS
SPECTRA, PHENYL RADICALS, REPRINTS

IDENTIFIERS: (U) PERFLUORONITRILES, DIPHENYLPHOSPHINE
PHOSPHINE DIPHENYL, OCTANONITRILE PERFLUORO N, PE61102F,
WUAFOSP2303B2

TECH REPORT BIBLIOGRAPHY   SEARCH CONTROL NO   EVN54B

AD-A171 692   9 4   12 1

AD-A171 692   CONTINUED

PRINCETON UNIV NJ DEPT OF ELECTRICAL ENGINEERING AND
COMPUTER SCIENCE

(U) Improvement of Resolution and Reduction of Computation
in 2D spectral Estimation Using Windowing.

Likelihood. Bartlett windows. Support sizes.
AR Autoregression. Windowing. Computation rates.
PE61102F WUAFOSR2304A6

MAR 86   6P

PERSONAL AUTHORS:

CONTRACT NO: AFOSR-81-0228

PROJECT NO: 2304

TASK NO: A6

MONITOR:

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTIVE NOTE   Final Rept   1 Apr 31 Dec 85

Aug 86   141

PERSONAL AUTHORS   Vanselow Ralf

REPORT NO   144 W620

CONTRACT NO   N00014 85 G 0100

MONITOR   AFOSR
          TR 86 0823

ABSTRACT   (U)   Paper topics Surface Structure Analysis
by Low Energy Alkali Ion Scattering Scanning Tunneling
Microscopy A Critical Review, Georg Maria Schwab Early
Endeavours in the Science of Catalysis, Early
Spectroscopy of Adsorbed Molecules, Inverse Photoemission
Spectroscopy, Multilayer Films Wetting Behavior
Molecular Organometallic Chemistry and Catalysis on Metal
Oxide Surfaces, Effects of promoters and poisons on
Surface Reactions, Thermodynamics and Kinetics in Weakly
Chemisorbed Phases, The Life and Times of Paul H Emmett,
Catalysis by Molybdena Alumina and Related Systems,
Surface Electronic States, Use of Spin polarized
Electrons in Surface Analysis, Stable Intermediates on
Transition Metal Surfaces, Field Emission Microscopy
Trends and Perspectives, Wetting An Experimenter's View
Catalysis by Metals, High Resolution Electron Microscopy
in Surface Science, Structure and Catalytic Performance
of Zeolites, Elastic and Inelastic Electron Scattering
for Surfaces, Time of Flight Atom Probe Studies of Gas
Surface Interactions, and Kinetic and Spectroscopic
Investigations of Surface Chemical Processes.

DESCRIPTORS   (U) *SURFACE CHEMISTRY, *CATALYSIS, WETTING,
ELECTRONIC STATES, ELECTRONIC SCANNERS,
TUNNELING, ELECTRONICS, ELECTRON MICROSCOPY, EMISSION
SPECTROSCOPY, PHOTOELECTRON SPECTRA, SPIN STATES,
ALUMINUM OXIDES, MOLYBDENUM COMPOUNDS, ELECTRON
SCATTERING, INELASTIC SCATTERING, ELASTIC SCATTERING

AD A171 949

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO CVN548

AD-A171 441   9/4

TEXAS A AND M UNIV COLLEGE STATION

(U) Memoryless Detection of Time Varying Deterministic
     Signals in Dependent Non Gaussian Noise

DESCRIPTIVE NOTE: Rept. for 23 May 85-22 May 86

JAN 86   6p

PERSONAL AUTHORS: Bleker J P ; Halverson Don R

PROJECT NO: 2304

TASK NO: A5

MONITOR: AFOSR
            TR 86 0400

SUPPLEMENTARY NOTE: Pub. in IEEE Transactions on
Information Theory, IT 32 n1 p133-139 Jan 86.

ABSTRACT: (U)   Memoryless discrete time detection of a
known time varying signal in dependent non Gaussian noise
is considered. Optimal detectors are specialized to cases
where the detector nonlinearity, a time varying and
incorporating a portion of memory, is provided by the
author.

AD-A171 441   CONTINUED

IDENTIFIERS: Supplied ...
Field ...

UNCLASSIFIED REPORT

ABSTRACT   (U)   A device is maintained under an age
replacement policy. The status of the device functioning
or failed is known only by inspection at some fixed
interval. With probability q an inspection error may
be made, and a functioning unit will be declared to have
failed and be replaced by a new unit. On the contrary
when a failed unit is inspected, it is assumed that no
inspection error will be made. Assuming that the cost of
replacing a failed unit is actually failed or replacing a
functioning unit, we show that we can obtain an optimum
replacement age which minimizes the long run
expected cost per unit of time. We find a lower bound for
the optimal replacement age. Statistical, asymptotic and
monotonicity properties are also presented. Author

DTIC REPORT BIBLIOGRAPHY   SEARCH CONTROL NO. EVN54B

AD-A171 128   14 2   9 3   6 4

AD-A171 112   12/1

SRI INTERNATIONAL MENLO PARK CA

RENSSELAER POLYTECHNIC INST TROY NY DEPT OF COMPUTER
SCIENCE

(U) Electromagnetic Sensor Arrays for Nondestructive
Evaluation and Robot Control

(U) Adaptive Refinement Methods for Non-Linear Parabolic
Partial Differential Equations.

DESCRIPTIVE NOTE Annual technical rept no.1 1 Sep 84-
31 Aug 85.

86   11P

OCT 85   28P

PERSONAL AUTHORS: Bieterman,Michael ;Flaherty,Joseph E. ;
Moore,Peter K. ;

PERSONAL AUTHORS: Bahr,A. J. ;Rosengreen,A. ;

CONTRACT NO. DAAG29-82-K-0197. AFOSR-80-0192

CONTRACT NO F49620-84-K-0011

MONITOR: ARO.AFOSR
19512 11-MA.TR 86-1031

PROJECT NO. 2306

TASK NO A2

UNCLASSIFIED REPORT

MONITOR AFOSR
TR 86-0511

SUPPLEMENTARY NOTE Pub. in Accuracy Estimates and
Adaptive Refinements in Finite Element Computations. p339-
357 1986

ABSTRACT (U) This document considers two adaptive
finite element techniques for parabolic partial
differential equations/PDEs, that are based on using
error estimates to control mesh refinement. One technique
is a method of lines 'MOL' approach that uses a Galerkin
method to discretize the PDEs in space and implicit
multistep integration in time. Spatial elements are added
and deleted in regions of high and low error and are all
advanced with the same sequence of varying time steps.
The second technique is a local refinement method. (RM)
that uses Galerkin approximations in both space and time.
Fine grids of space time elements are added to coarser
grids and the problem is recursively solved in regions of
high error.

UNCLASSIFIED REPORT

ABSTRACT (U) The objective of this research program is
to develop the theoretical models, design methodology,
and technology needed for optimum application of near
field electromagnetic sensor arrays in nondestructive
evaluation (NDE) and robot control to aid in
understanding how best to analyze and control the spatial
frequency content in the field configuration generated by
an array. most of this year's effort focused on obtaining
experimental measurements of the relative spatial
distribution method by the responses of inductive eddy
current reflection probes to surface steps and surface
breaking rectangular slots in aluminum plates. It
particular, a commercial reflection probe Nortec SPO
2065, and an SRI constructed ferrite coil and core
reflection probe have been used. Interrogate such
surface discontinuities. The data obtained using the five
coil probe compare favorably with the results of the
developed theory.

DESCRIPTORS (U) FINITE ELEMENT ANALYSIS QUALITATIVE
DIFFERENTIAL EQUATIONS. PARTIAL DIFFERENTIAL EQUATIONS.
ERROR ANALYSIS. ESTIMATES. MESH
APPROXIMATION MATHEMATICS. REPRINTS

DESCRIPTORS (U) PROBES. ELECTROMAGNETIC. DETECTORS
AUTOMATION ROBOTICS. NONDESTRUCTIVE TESTING. TEST
EQUIPMENT EXPERIMENTAL DESIGN THIN FILMS. MAGNETIC
HEADS. MAGNETORESISTANCE

IDENTIFIERS (U) Galerkin method (U) Method of lines
(RM) Local Refinement Method

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